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Computer Weekly

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Computer Systems

DEC, Wang and Apple beat the recession

by Kevin Cahill
WITH the recession pounding away at the profits of most US computer majors, three leading manufacturers of medium and small systems have bucked the trend with sparkling results.

Digital Equipment Corp, Apple and Wang have all reported improved half-year and quarterly figures.

DEC showed the strongest performance, with turnover improving 27% in the second quarter, and profits up 42% at \$99.1 million, compared with \$69.9 million for the same quarter of 1980. Sales were \$96.8 million for the quarter compared with \$76.3 million in the December quarter of 1980.

DEC's half-yearly results showed a profit improvement of 49% at \$187.9 million, and sales showed a 27% gain at \$1.81 billion. The sales growth is even better than the 27% growth predicted by the company last year, though it is below DEC's historic 35% annual growth rate.

While predicting that this current quarter would be "an up quarter", DEC is cautious about the general prospects, saying that it continues to see a slowing in world economies and a moderation in the pace of business.

DEC's profits were substantially boosted by a huge interest payment to the company of \$23 million, implying that the powerful profit rise owes more to good financial management than to the company's computer business. Interest payments of that size in one quarter imply cash balances of \$600 million or more, assuming that the payments are for the quarter and not for the year as a whole.

A spokesman at DEC in the UK said that the UK company did not produce half-yearly results but that the business was reflecting the US pattern.

The UK company is continuing to invest heavily, with markets in the manufacturing and engineering sector particularly buoyant. DEC in the US has slowed

down its traditional hiring rate by about 20%, and the UK is observing caution in taking on staff. But UK recruitment is continuing, according to the spokesman.

DEC worldwide will stick to its 25% increase in the capital spending plan and will invest over \$500 million this year.

Apple Computers' profits for the first quarter of the company's new financial year doubled to \$13.4 million when compared with the first quarter of 1980/81. Sales also almost doubled, from \$67.6 million in the first quarter 1980/81 to \$133.6 million.

This performance, if sustained throughout the year, could take Apple through the \$500 million barrier for the year as a whole. The company says that it expects performance to improve as the year progresses and it reaps the full benefits of sales of the Apple III.

Wang, which is also focused on the minicomputer and micro end of the market, improved second quarter profits by \$6.2 million to \$25.2 million compared with the second quarter of 1980/81.

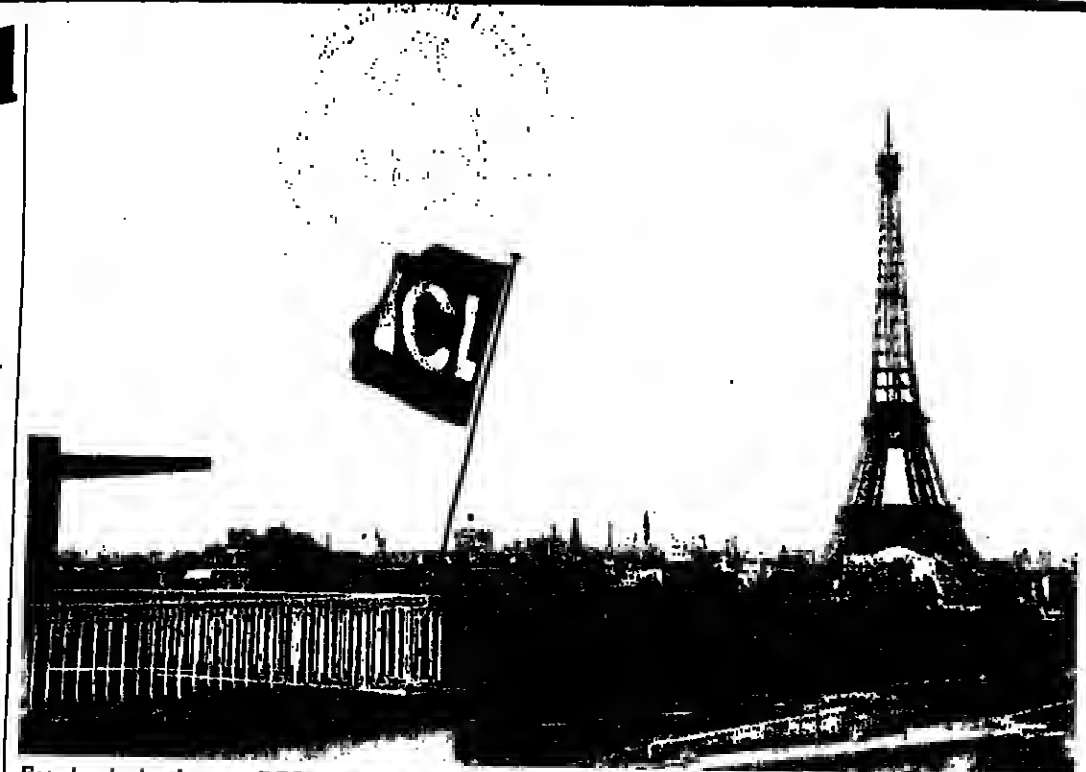
Sales for the quarter rose to \$273.4 million, a \$71 million improvement on the same quarter last year.

Wang's half-yearly results show the company well on the way to passing the \$1 billion dollar barrier by year-end. Half year sales were \$510 million compared with \$358 million for the first half of 1980/81.

● Data General has produced slightly weaker gross profits of \$19.4 million for the quarter, compared with \$20.5 million for the same period in 1980/81.

Turnover rose \$27 million to \$182.5 million for the period, but company president Bo de Castro said that inflation and recession will continue to have a dampening effect on the company's rate of growth.

Data General's weak profit performance was a sample of the gloomy results produced by several other computer companies (see Company News, page 10).



Four hundred and seventy DRS 20s will link 126 branches in Northern France.

French bank orders DRS 20s

by Andrew Thomas

IN the biggest single deal for the DRS 20 series since its launch in October, ICL has received an order for £1.8 million worth of its distributed processing systems from one of France's leading banks.

La Caisse Regionale de Credit Agricole du Nord (CRCAN) has ordered 470 of the DRS 20 multi-microprocessor systems for installation in its 126 branch offices in Northern France. They are to be used for a variety of banking and word processing applications.

The bank's head office in Lille will also be equipped for management information and program development.

The DRS 20s will form a distributed processing network with links between branch offices and the Burroughs mainframes at the bank's main data centre in Lille. This is the first time DRS 20s have been ordered for use in conjunction with Burroughs hardware.

The Lille bank's own programming group will be doing much of the protocol conversion work re-

quired to allow the ICL and Burroughs machines to converse.

An ICL spokesman said that a complete conversion package was normally offered, but that CRCAN had not yet decided on whether to implement ICL's CDS or the 3270 protocol used on the Burroughs system. ICL's local area network, Microbus, will be used to link different DRS 20 systems.

ICL is about to link DRS 20 systems to an IBM mainframe "somewhere in the UK," the spokesman added.

STAR Computers, which own the Stock Exchange's Uniflex terminals, has ordered an ME29 to replace its IBM system. Another ME29 goes to sportswear manufacturer Nabholz.

Redner Textiles is replacing its 1901 with an ME29, and bee-keeping products manufacturer Paracell is installing a System 25.

Recent UK orders include a £100,000 deal for two System 10 with Centre Computer Services, the Birmingham-based bureau.

ICL also looks set to win a £10 million order from supermarket giant Sainsbury, which is planning a nationwide point of sale network using System 25s to link its 2900 mainframes in London to the 216 branches throughout the UK.

These and other recent impressive boosts to the company's order book lifted shareholders as chairman Christopher Laidlaw ex-

pressed his confidence in the company's prospects.

The order was won against competition from two US companies on the department's shortlist, Sperry Univac and Raytheon.

Helping the decision to buy ICL kit is that DRS 20 is currently manufactured at Utica, in New York State. ICL is planning to build the machines in the UK, but has not yet done so.

Meanwhile, in Europe, ICL has clinched a total £1.5 million of orders from several customers in Switzerland.

● Turn to back page

NEWS BRIEF

First digital connections for System X

THE first digital connections between System X exchanges have been made between Cambridge, trunk exchange and the local exchange 10 miles away.

This is the first link of a national overlay network which will provide digital connections between subscribers on different System X exchanges even at most of the rest of the network still based on analogue exchange.

Arrington is only the second System X local exchange to provide the first at Woodbridge in summer, and the first of its 670 subscribers would have been on the same exchange in a faster.

Fair's fair

THE telecommunications legislation bill recently passed by the US Senate empowers the Federal Communications Commission to bar sales of Japanese equipment to US companies into its market.

Star profits

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New York State \$28 million order

Fistful of dollars lifts ICL

by Andrew Thomas

EXPORT success is spearheading ICL's fight back to profitability, with major successes in the US and Europe for the company's small systems. The newly-announced DRS 20 microcomputer and the bigger System 25 are poised for orders in the US and Switzerland as well as selling strongly at home.

In the US, ICL is set to win a \$28 million order from the New York State Department of Social Services, which has signed a letter of intent to buy 2,400 DRS 20 systems to be installed in its offices over a two-year period, starting later this year.

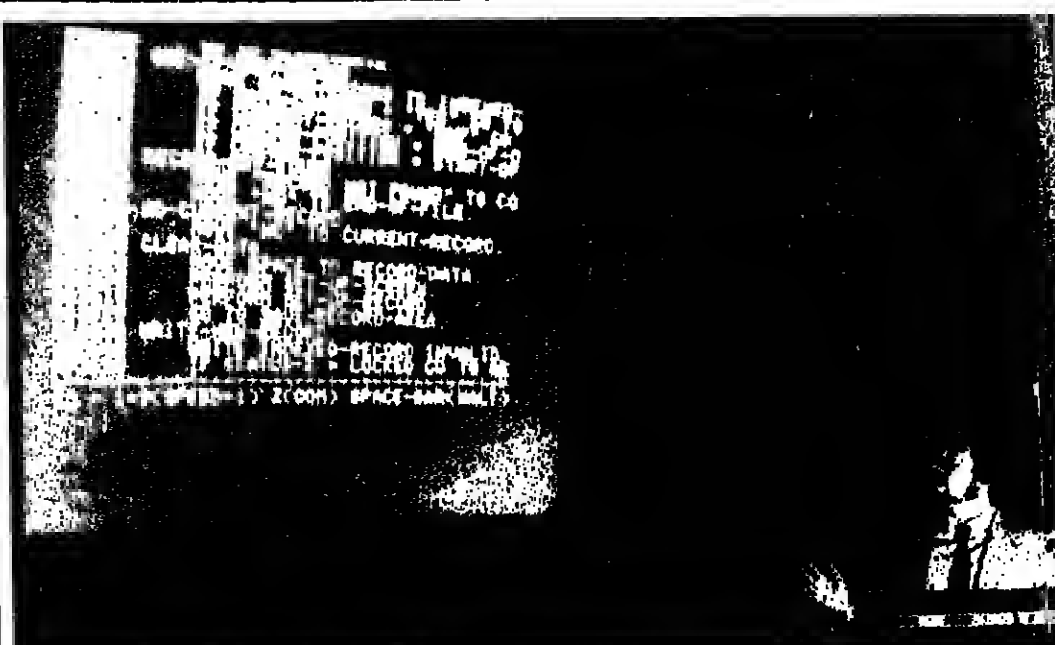
The single deal almost equals ICL's 1981 total sales in North and South America of \$30 million and US orders are now running at double last year's levels.

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● Turn to back page



REYNOLDS... Still life programs turned into a movie with Micro Focus CIS Cobol

Debugging goes portable

by Claire Gooding

SOFTWARE development has taken a major step forward with the release by Micro Focus of two programming aids which are portable across all ANSI '74 standard Cobol installations. The tools, called Animator and Slideshow, run on a microcomputer, but they are likely to reach beyond the micro market into large mainframe installations.

In a live show which brought interactive Cobol programming to life last week, Micro Focus projected on to an overhead screen the real time execution of Cobol source code running on an Apple microcomputer. The tools work in harness with the firm's lead product, the CIS Cobol compiler, which brought ANSI '74 standard Cobol to micros for the first time.

Both products go beyond the scope of the interactive debugging tools which have long been available to programmers in low level languages like Basic.

Animator allows a Cobol programmer to step through the source code of a program as it runs. The cursor follows the logic paths, jumping down the code as the program executes at a speed set by the user. Programmers can enter test data through the screen, then run the program using the data to check values of variables, which change as the code is executed.

Slideshow is an equally visual tool which is geared to the creation and maintenance of the "user interface" part of programs. This includes menus, text displays, and still or moving colour graphics, and other means by which the non-programming user can communicate with the machine.

Large users are busy re-vamping large systems for use by inexperienced end-users, the job for which Slideshow was built. They also have a need for such tools as Animator since staff turnover and the size of their systems makes

maintenance a problem.

"These products are changing what programming's all about," said chief executive Brian Reynolds. "It's like turning a still life into a movie. That sort of aid helps programmers understand programs they didn't write themselves. It means improved maintenance quality on any machine in the world."

Micro Focus has won a market for CIS Cobol - the CIS stands for Compact Interactive Standard - because it has adhered strictly to what is standard, and therefore portable. It does not rely on support outside itself like other languages, or on a particular operating system. This has given the firm an edge on others when transporting the compiler to new systems.

"Total self-residency is a must when it comes to being the first on a new processor," said Peter He-

● Turn to back page

Software journal out in spring

BRITAIN'S first journal concentrating exclusively on software is to be launched this spring by Computer Weekly, Callod Software, it will be the latest in a series of innovations in the coverage of today's most important area for computer users.

Software is aimed at the people within medium and large organisations who are responsible for buying software. With a controlled circulation of 20,000, it will cover the senior and middle-ranking personnel among users with the all-important job of buying or specifying software or software services.

That includes the purchase of new packages, or even whole computer systems, as well as hiring outside staff, renting outside software or employing bureaux.

Software will also be circulated to management among software houses, as well as to systems houses which "sell-on" packages.

Estimates of the amount of programmer time which is tied up at large user sites in maintenance of existing suites of programs varies, but is often put as high as 80%. Reflecting this, Software will be concentrating just as much on staffing costs and programmer productivity as on new packages and operating systems.

The range of software covered will span a mainframe to microcomputers for commercial use.

Computer Weekly was the first journal to recognise the importance of software when it started specialist coverage of the subject in the weekly page in Software File.

Last November this was supplemented by Software Month, a regular detailed examination of one area of the business.

DEC launches into micro market



HOARE... IBM Allegro awaits DEC's new micro.

by Kevin Cahill

THE world's largest minicomputer manufacturer and second biggest computer company, Digital Equipment Corp, is about to launch itself into the micro market with a new machine due within two months.

This is in addition to the Z80-based single board upgrade to the company's VT100 terminal, which many UK based DEC dealers are already selling as the DEC personal computer.

The new machine means DEC will be attacking two different but complementary markets. One is standalone systems, currently dominated by Tandy, Apple and Commodore, which IBM has just joined. The other is among the estimated 250,000 users of the company's popular VT100 termi-

nal, which can now be turned into a personal computer.

Steve Hoare, managing director of OEM Allegro which has so far sold one of the upgrades, called a Robin, said he expected the upgrade unit to sell for around £1,750. He says customers have shown great interest in the way the VT100, using the Robin, can be switched from a dumb terminal to an intelligent personal micro, "at the press of a button".

The Robin has 64K of RAM and comes complete with two 5 1/4 inch floppy disc units and the CP/M operating system.

With a basic VT100 now costing about £1,050 the upgraded VT100 undercuts the Apple III at about £3,500 in the UK and is cheaper than the IBM Personal Computer which is expected to sell here for about £2,950.

A DEC spokesman in the US said he expected a lot of existing VT100 users to go for the Robin rather than buying a standalone personal machine.

In the US DEC has opened its strategy for 1982 by cutting disc unit prices by up to 53%.

The discount is offered to any purchaser making a second disc drive with an initial RM80 unit. Other disc drives in the DEC range have had prices dropped by 40 to 45%.

DEC also announced a big new standard processor for the VAX 11/780 range this week. Although the rate of staff hiring has fallen recently at DEC, the company still expects to hire another 1,000 people worldwide in the coming quarter.

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Programmers slip down the salary ladder

by Philip Hunter
ALTHOUGH there is still a national shortage of programmers and analysts, they slipped a rung on the salary ladder in the last pay round. The increases were two per cent less than those for non-manual workers in general.

In April 1981 programmer/analysts earned eight per cent more than the average for non-manual workers, compared with 10 per cent over the preceding four years. This conclusion is drawn in a government survey* based on weekly earnings for April 1981, and included in Bargaining Report, published by the Labour Research Department of the TUC as a guide to trade unionists on pay and working conditions.

But the finding is contested by Computer Economics Ltd (CEL), which publishes detailed surveys of pay in the data processing industry every six months. CEL director Peter Stevens argues that pay rises in the computer industry are higher than they seem at first glance because merit awards and artificial promotions to bypass rigid pay structures are common and distort some published figures.

The fact that different interpretations are placed on job titles such as programmer and analyst also complicates the picture and makes direct comparisons between organisations misleading. The TUC report makes this clear, pointing out that although staff called programmers at the Midland Bank have a starting salary over £2,000 higher than similarly titled people at Lloyd's Bank, this is partly explained by the existence of an assistant programmer grade at the Midland, for which starting salary is considerably less.

Stevens throws a new perspective on often publicised North-South differences when he claims that these do not exist in the computer industry. The only geographical influence on pay is size of town, he says.

Mike Treasure, manager of permanent recruitment for Knight Computer Services, qualifies this by pointing out that salaries in the North are slightly lower than those further South, and also in Scotland.

"So few companies have had any money to invest in DP this last year that salary rises have fallen dramatically," he adds. "As soon as money becomes available, investment and a rush for staff will come, followed by steeper salary rises."

Of the manufacturing companies covered by the TUC report, ICI pays the highest salaries to all grades of data processing staff except senior operators, with operators earning an average of £6,700, shift leaders and programmers about £8,000 and systems analysts about £9,000 in 1981. With the exception of Ford, DP staff fare rather badly in the car companies covered, particularly at junior level.

In the public sector, DP salaries are consistently lowest at the universities, where there are identical scales for both operators and programmer/analysts.

Of the public sector organisations covered in the report, British Telecom is most generous to programmers, who in 1981 earned up to £12,976 at the senior grade. Operators do best at London Transport, earning up to £6,305, although shift leaders earn the most again at British Telecom.

* New Earnings Survey 1981: Part A HMSO £6.50.



PALMER... Discussing the possibility of co-operation with former CACI chief Tony Carter

'No competition' clause for ex-CACI staff

by Boris Sedeen

FORMER CACI employees are being required to sign non-competition agreements to obtain salaries in lieu of notice and expenses due, as well as leaving settlements from the company.

The non-competition clauses state that the individual may not be employed by or do consultancy work for any CACI client, and may not recruit staff from CACI employees.

"With the terms of settlement currently offered by CACI, my legal counsel has advised me to take my ease to the industrial tribunal," said one ex-employee.

Now Tony Carter, former chief executive officer and founder of CACI in London, is to compete with CACI when his non-competition agreement expires in just over a week's time. Carter has set up his own consultancy, called DMW.

Ian Palmer, former senior vice-president and database specialist with CACI has been discussing the possibility of co-operation with Carter.

"I am not in a hurry to take up any job," he said. "I want to write my books and do my own consultancy. If I take something on I want it to be in keeping with my responsibility and reputation."

● In the last issue of Computer Weekly, we stated that 22 employees had lost their jobs and that another 40 had resigned. We should have said that about 40 people had left including the 22 who lost their jobs.

Robots to aid CDC expansion

by Brundon Gamester

CONTROL Data has taken a lead in the UK computer industry with a plan to use programmable robots to speed the manufacture of its disc and tape products.

Despite the high element of computer technology in robots, at the end of 1980 only 20 had been installed throughout the whole of the UK electrical and electronic manufacturing industry, out of a total of 371 in all sectors.

Figures will soon be released by the British Robot Association which will show the latter figure to have climbed to 500 by the end of 1981, but as before the majority are accounted for by the automotive and metal goods industries.

Control Data's plan is to install 10 robots by the end of 1982 at its magnetic media plant in Brynmawr, Gwent. According to plant manager Dennis Mahoney, two Unimation Puma robots have already been installed and are used to carry out part-machining work.

The robots are being used to expand production and no labour will be displaced by the machines, which are expected to do the work of six to eight men over a 24-hour period, says Mahoney.

The automation of the Welsh plant comes near the end of a period of major capital investment. Since 1979 £10 million has been spent and the workforce has grown from 500 to 850. More staff will be taken on over the coming year but this is likely to be to tens rather than hundreds.

● The Brynmawr factory currently exports 70% of its output. By the time the additional robots are installed it will be capable of producing a million discs and 2½ million reels of tape a year, to make it the biggest operation of its kind in Europe.

DBMS micro with UK users

by Claire Gooding

THREE major deals have been secured for one of the most popular database management systems for microcomputers.

They have been signed by recently appointed distributors in this country for FIS, BSC, and the most popular microcomputers running a CP/M operating system, distributed by US Systems Plus.

Microcomputer manufacturers Memory Computers, Ltd. and Mediatech have bought the right to offer on their sales, also been added to the list of approved software products for left-Packard's HP125 micro along with Infodata's own information system.

Infodata's marketing manager Paul Armour describes FIS as giving the best of both worlds, easy to use but at the same time comprehensive.

"It gives the ability to turnkey applications very quickly," he said. "What is, in my opinion, a very good thing, this comprehensive, easy to use but at the same time learning how to use it, but FIS allows for different levels of use so that once a user has mastered the elementary parts he can do short cuts and make the system more."

The product works on all levels, producing the same inquiries, standard report generators, the second, and a structured programming language, EPL, extended File Maintenance and third.

Author of EMS 80 Dennis Mun, is currently working on a Unix and CP/M 86 version of the system.



Alex Sozouff, vice-president of the Information Systems International Division of Harris Corp and William Walgrave, Parliamentary Under-Secretary of State in the Department of Education and Science, at the opening of the computer centre at Lancaster Polytechnic, Coventry.

£1m computer centre picketed in row over Harris system

by Chris Youett

ANGRY students and lecturers picketed Lancaster Polytechnic's new computer centre at Coventry last Thursday, complaining that the new computer system was unreliable and had given poor service since it was installed last April.

The £1,000,000 centre, which was built largely on donations from Harris Information Systems and Marples Ridgeway Builders, has what is said to be the largest Harris system in the world outside the US.

The 2 Mbyte Harris H800 has so far proved unreliable, said senior computer science lecturer Rod Gealish. "Many of my students are worried about not being able to get their degree course work completed on time," he added.

Harris vice-president Alex Sozouff told demonstrators: "There are always teething problems. It is a complex system and I am very sorry this has happened. We could have done better and I will take steps to put everything right."

The centre, which the City Council hopes will serve local schools as well as the polytechnic, was opened by junior Education Minister William Walgrave, who said: "It is quite essential, even when resources are as short as they are now, to continue to direct enough money to the new technologies."

It is also essential to manage scarce resources of all kinds in the education world with the same ruthless eye to efficiency that has been forced on industry."

Lancaster's new computer centre is an addition to Harris H500 and H100 systems which were already installed at the polytechnic. There are plans to connect all three processors to form a local area network.

The system replaces an ICL 19035 and has over 100 video terminals. Languages available include Fortran 66, Fortran 77, Cobol, Basic, RPG2, Sacol and Pascal. It runs a Cincron Total database plus graphics software.

BT releases plans for first joint ventures

by Donald Kennett

THE long-awaited news of how British Telecom will tackle the government's proposal to set up joint ventures as a means of raising investment capital was released last week with the announcement of Marlesham Enterprises.

Operating in partnership with several City financial and management organisations, Marlesham will act as a holding company with plans to launch several commercially active subsidiaries over the next two or three years.

Ideas for commercial products or services generated by BT's research activities at its Marlesham Heath laboratories near Ipswich will form the basis of new companies in which the inventors will be able to have a stake.

They will be able to call on Marlesham Enterprises for advice and financial support, and will be able to use the resources of the laboratory on a commercial basis.

Land is available in the area and the new venture could well spawn another science park of high technology companies.

Involving BT in joint ventures was one of the original proposals of the government when announcing the British Telecommunications Bill 18 months ago. It was seen as a way for BT to raise investment capital for some of its activities, but the then chairman of

BT, Sir William Barlow, rejected the idea.

Current chairman Sir George Jefferson said: "Marlesham has always been a powerhouse of ideas which have exceeded the direct needs of the telecommunications business." Joint ventures will enable many more of them to reach the market.

BT spent £35 million on research last year, and Marlesham Enterprises has been set up with a share capital of £250,000, of which BT owns 30%. BT will be able to earn royalties as well as dividends from the new activities and will be free to sell off its holding when each subsidiary reaches the stage of being publicly floated. It puts no financial burdens on BT's customers, Sir George said.

Chairman of the new company is Mark Burrell, a director of merchant bank Lazard Brothers. Lazard has 20% of the shares and controls a further 20% through Raburn Investment Trust.

Electra Investment Trust owns 25% and management company Thompson Clive and Partners the remaining 25%. Electra's managing director Michael Stoddart, who is a director of the new company, said: "Marlesham Enterprises represents just the right combination of skills to give the best possible backing to innovative ideas from Marlesham Heath."

Labour Party pledge to nationalise high technology industries

by Our Parliamentary Correspondent

PUBLIC ownership of the microelectronics and other high technology industries has been advocated by the Labour Opposition in the Commons.

Labour's Shadow Industry Minister, Stan Orme, has called for a massive public spending programme of £8 billion to £9 billion as a means of cutting back the 3 million dole queue.

And he said during a Commons debate on the jobsless figures that he wants much more spent on knowledge intensive industries such as computers, robotics, machine tools, telecommunications and energy-saving equipment.

Orme identified these as "priority areas". He went on to attack the government for having off assets, such as sections of the telecommunications industry, and said the next Labour government would renationalise

those assets at the earliest opportunity.

He went on: "A future Labour government will extend public ownership in key sectors of the economy, not least in areas where new industries such as microelectronics and high technology will have to be created. This is where public money can go, where investment can take place and where we can give a positive lead to industry."

He recalled that his government had created Immos. Orme's speech followed the government's announcement that unemployment had risen above 3 million.

His criticisms were answered by Industry Secretary Patrick Jenkin, who said the government had been spending considerable sums to stimulate new technological developments.

Jenkin said that the fear that new technology would inevitably lead to fewer jobs had hampered

progress down the centuries.

He tried to reassure MPs by quoting the Advisory Council for Applied Research and Development, which said: "More unemployment results from loss of market share following a failure to innovate than from the introduction of new technology. If new technology leads to an increase in market share, there is generally an increase in employment opportunities."

Japanese unemployment was low because the Japanese had innovated and captured new markets. That was why the present government had taken specific measures to encourage the spread of new technology in Britain, Jenkin went on.

The government had maintained and expanded the product and process development scheme and introduced schemes to accelerate the spread of modern microprocessor technology, he reminded the House. Under the



ORME... "We can give a positive lead to industry."

Microprocessor Applications Project, MAP, £55 million had been allocated to make industry more aware of that enormously important revolution and to help with investment schemes.

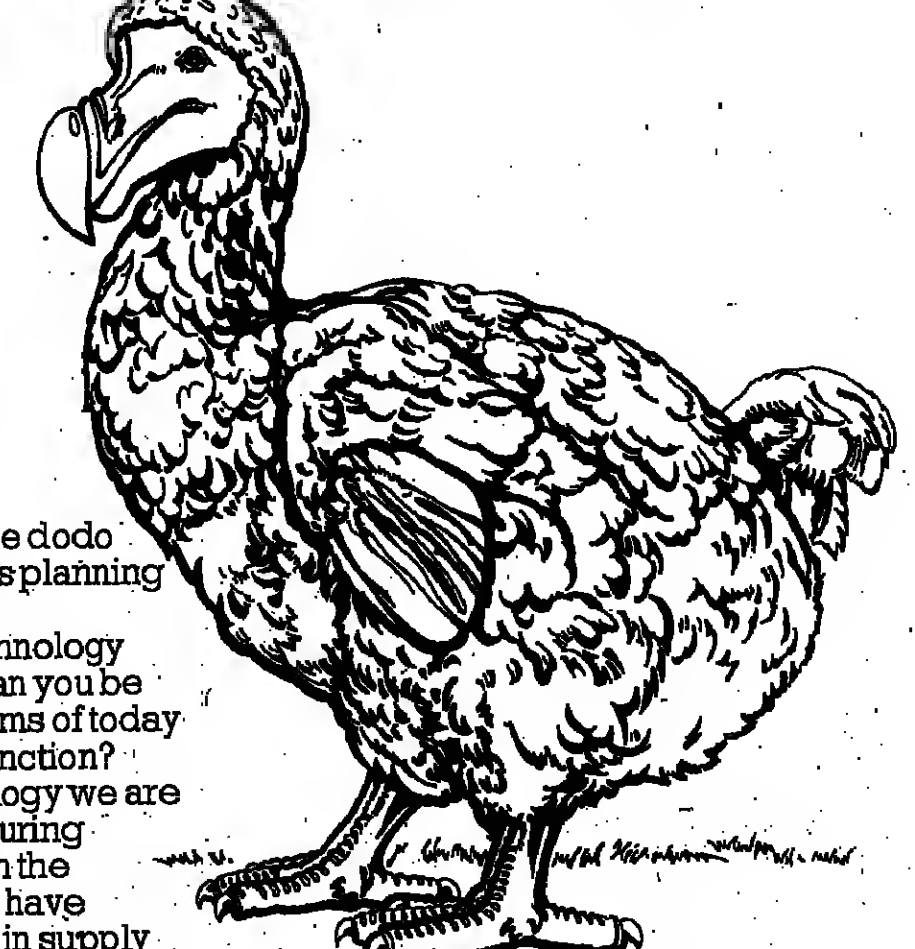
Some £40 million of that had been committed to specific projects by the end of 1981, with £19.8 million actually spent.

In addition, £55 million had been allocated to the Microelectronics Industry Support Programme, MISP, to help the industry develop its products, Jenkin pointed out.

There were schemes in this country to support the development of fibre optics, of robot machine tools and integrated robot systems, he said.

● Government promises CAD/CAM support. See page 6.

EVOLUTION OR OBSOLESCENCE?



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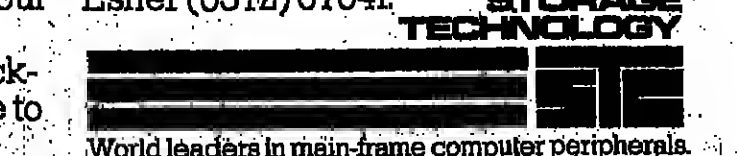
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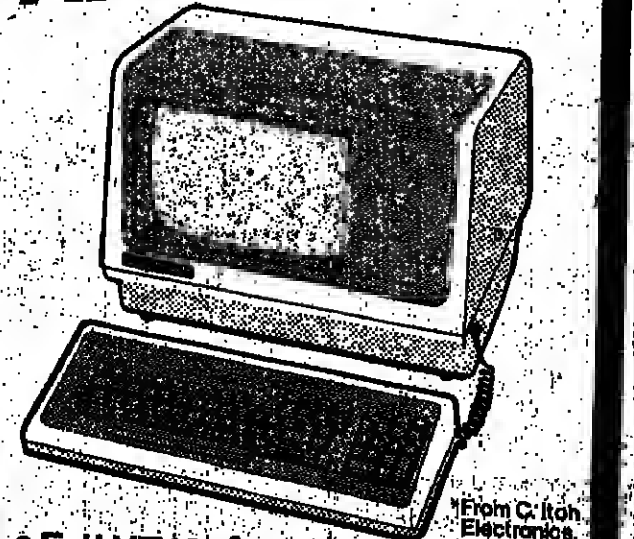
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UK companies ahead with Z-Net

by Robert Parry

BACKING up Zilog's push to establish Z-Net as a low-end standard for microcomputer networks, two British companies are gaining an edge on rivals by building in Zilog's network technology.

Both companies, Research Machines of Oxford and Watford-based Automatic Revenue Controls, took out Z-Net licences in the spring of 1981 and now feel they are ahead of competitors in bringing out network-based systems.

Research Machines' product, to be sold as the Chain, is a network

joining up systems of its new educational microcomputer, the Link 4802. Aimed at primary and secondary schools, where its predecessor the 3802 is well established, the 4802 is a cassette-based machine designed to act as a network airlink.

Co-operation between Research Machines and Zilog speeded up development of the Chain, according to Research Machines' marketing director Mike O'Regan, and opened up a way to add other manufacturers' equipment to the network by fixing on the Z-Net standard.

The Z-Net based hotel security system from ARC, Guestkey, combines security control via push keys programmed for particular locks with management information. After a six-month trial, a Z-Net system is being installed in the House Forte's Grosvenor Hotel in London, the first of several to be installed by ARC.

According to Zilog's European marketing manager, Paul Geisler, what people are looking for with the Z-Net licence is simplicity. The interface to the network only needs three chips, including Z80A processor.

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IT Year 'will increase mistrust and conflict'

THE UK government's awareness campaign for Information Technology Year has been condemned as highly misleading at an EEC conference. It conceals the problems to do with new technology and discusses only the benefits, the conference was told.

Speaking to the EEC's gathering on The Transition to an Information Society, Professor Neils Bjorn-Andersen of the University of Copenhagen pointed to a National Computing Centre pamphlet on how IT would aid every aspect of education. This was "like selling a trip to Guernsey," he said.

The result would be to increase mistrust and conflict in society. In Denmark, promotional material gave the pros and cons and encouraged debate, he added.

Eric Howe of the NCC replied that he thought there might have been the same reaction on the move from stone and chalk to paper and pencil.

The four-day conference, convened as part of the EEC

FAST programme Forecasting and Assessment in Science and Technology, made a series of recommendations to the Commission for further research, in such areas as: How to protect children from over-reliance on IT, "data bank imperialism", new methods of indexing from the user's point of view, methods of training, and the use of IT in surveillance, and benefits in looking after single old people for example, but also the possible threat to civil liberties.

Professor Giuseppe Lanzavecchia of the Italian Atomic Energy Commission called for a co-ordinated Europe-wide programme of research which could make sensible decisions about which technologies could best be acquired from the US and Japan and which could best be developed independently. He referred to the proposed Esprit programme, currently under consideration at the Commission, for promoting component manufacture, robotics, and office automation. The plan is expected to be published by the end of 1982.

Much of the talk at the conference was along the traditional lines of "technology must be designed more from the human angle." This led one senior UK civil servant to complain that the meeting showed a lack of appreciation of the real world.

"It is economic survival that governs what we do," he said, adding that the conference had not been a success because it had failed to come up with any answers.

Others among the 120 participants thought that at least technologists and social scientists had been brought together, and that better ways of assessing, for example, the impact of automation on factory employment might result.

Organiser Erid Mumford, of Manchester Business School, pointed out that the venue, the Selsdon Park Hotel, had also hosted the Tory conference in 1970 this had led to the expression Selsdon Man. Perhaps after this meeting Selsdon Man would become as famous, she said.



BJORN-ANDERSEN . . . UK campaign "misleading."

Go-ahead for French electronic directories

THE French government's plan to provide electronic telephone directories is moving ahead, although as a voluntary trial, despite reports that the Socialist administration would axe it. This was made clear to the EEC FAST conference by Jacques Dondoux, head of the French PTT, who said that former President Giscard's revolutionary brainchild had been operating at a profit and was hoping to continue to do so.

Last year 250,000 terminals were installed in Brittany and Paris, and a further 500,000 would be ordered in 1982, Dondoux said. Other applications, such as adver-

tising, would be promoted for the terminal, he said, but care would be taken not to compete with small ads in newspapers. "We don't want to destabilise anything," he explained.

The directory system would thus be competing with Teletel, the French videodata service. "We find this compatible," Dondoux said.

The original idea of the scheme was to encourage the development of cheap terminals by the generation of an enormous market. The terminals are provided free, posing a serious threat in the sale of Teletel sets.

Under the new arrangement one in two households in the Brittany experiment was opted for the electronic directory, Dondoux reported. Those who did not were given photographically reduced printed directories, with a plastic magnifier.

The electronic system should save money in towns, Dondoux said, by, for example, eliminating the four kilos of paper directories delivered to each house in Paris every year. The scheme would not be extended in country areas where it was not economical.

Dondoux laid great stress on the

choice that was being given, saying that for any technical change the new administration was "negotiating between the potential winners and potential losers," ensuring that society as a whole benefited. He thought that nationalisation of the French telecommunications companies would not change the competitive situation; the concern was simply to avoid private monopolies.

Asked about the effect of international data traffic on GATT trade agreements, Dondoux said he thought that data was "not really that important."

SALES BRIEF Honeywell delivers UK's first DPS 7

THE first Honeywell DPS 7 machine in the UK has been installed at re-insurance broker Pearson Webb Springbett & Co. in London. The machine is made in France. The system is based on DPS 745 processor and costs £200,000.

It will be used by 8000 accessing the company's sales broking and underwriting systems from offices in the UK, Bermuda and New York. Honeywell Level 64 will continue to be used for development, back-up and test work.

Gas system

FERRANTI has won a tender for a natural gas production and distribution control system for one of West Germany's major producers, Brigitta and Elbert Betriebsfuhrung. Ferranti's main subsidiary will develop the applications software, while the hardware, seven Ferranti 4700-Gs, will come from the UK.

£300,000 saving

ROOTS, the high-street chemist, has increased its order by 150,000 for a weight-monitoring equipment from Morlen-based Kins Apsol Technology, following a 12-month trial with a limited range. The company should be able to save £300,000 a year by extending the system to cover most of non-pharmaceutical lines. The largest system will cost £150,000.

Hong Kong first

THE first ICL System 25 in Hong Kong has been ordered by Tootal's subsidiary English Seng. It will use an enhanced version of ICL's business control package Stars for inventory, orders, debtors, accounts and sales analysis work in connection with its 800 customers throughout South East Asia.

MoD software

PLIET-based consultancy Systems Designers has won a major Ministry of Defence software design contract to carry out communications modelling, design a management information system and develop software tools to handle information in the US defence system.

Maintenance deal

GENERAL Computer Systems engineering division has been signed up by IRR Microsystems to do maintenance and repairs under warranty on the Nippon Electric PC-8000 microcomputer. IRR expects to sell 3,000 PC-8000s in the next year through its 41 dealers. GCR expects to gain £250,000 worth of business over the next 15 months through the deal. Over 100,000 PC-8000s have been sold in Japan.

Altered images

In last week's Computer we published a picture of Jim Chester of NatWest Bank alleging that he was Brian Johnson of NMW. Apologies.

OCL looks set to loosen its ties with IBM

by Boris Sedacca

THE UK's largest container shipping group, OCL, looks set to move another step away from IBM's apron-strings when it decides this week whether to buy Datapoint equipment for its regional offices.

OCL is a leading IBM plug-compatible installation and was the second UK user for National Advanced Systems' large-scale AS9000 mainframe processor. The first buyer of the Hitachi-designed system was Guardian Royal Exchange.

According to Brian Barber, head of management services at OCL, the company plans to integrate its computing facilities into new office automation functions at seven regional offices initially.

"At the moment, our regional offices have screens connected to our mainframe through a teleprocessing network. Our objective is to provide users there with additional facilities for local processing, word processing and electronic mail."

Barber added that the system would be implemented over a period of 18 months to two years. The proposal for Datapoint has been through the board of our European company and now has to go through the main board which will decide this week whether to go ahead or not, although I do not anticipate any problems.

The system will eventually be expanded to OCL's office in Rotterdam which co-ordinates the activities of shipping agents on the rest of the Continent.

Barber explained that IBM could not provide an integrated office automation system at the time OCL was making its evaluation. "I do not think that IBM has got its act together in office automation. One could only buy individual boxes at the time."

IBM has recently been pushing a complicated software strategy for office automation, Distributed Office Support Function and Distributed Office Support Systems, which uses in previously discrete pieces of word processing hardware and establishes the beleaguered 8100 communications processor as a kingpin for integration with host data processing on mainframes.

"IBM may well be establishing a software standard for the future but that does not stop users from buying other hardware once it has done so. OCL is in the shipping business and I see no religious ethic which says that a company must stay with IBM software."

Barber contended that OCL has had a large system in existence for a long time and that Datapoint's hardware was compatible with that system. Therefore, he argued, there was no need to stay compatible with IBM.

Exciting comms potential

by Donald Kennett

A POINTNET to possible directions communications services could take in the newly liberalised UK market was given last week by two US researchers.

Dispute arbitration, 24-hour bridge games, and political lobbying could all be organised through computer-based message services, with their operating software tailored to serve specialised groups or applications, members of the Butler Cox Foundation were told.

The researchers are Drs Murray Turoff and Roxanne Hiltz, a computer scientist and a sociologist who have co-operated since 1974 in studying and the effects of the Electronic Information Exchange System based at New Jersey Institute of Technology.

The group currently has 800



TUROFF . . . EIES is still an experiment.

members in the US and Europe. EIES is still an experiment rather than a full commercial service, although it is sustained by members' subscriptions, and members have to agree to co-operate with the research on its use.

Facilities on the service include messages, conferences, files and a text editor.

France still welcomes US partnerships

by Jack Geo

FRANCE is trying to reassure US computer companies that its moves to strengthen domestic computer manufacturers do not mean that the Americans must leave. The French government is reacting to the announcement that Honeywell is to reduce its stake in CII-Honeywell Bull, from 47% to under 10%.

The Minister for Economic Planning, Michel Rocard, has publicly reassured US firms which are investing in projects within the French computer industry that their partnership is still welcome. This is despite nationalisation of the biggest French computer companies and the direction of others to stop co-operative ventures with the US and join together within France.

Companies which are due to be nationalised, including Thomson and Saint Gobain, majority owner

of CII-Honeywell Bull, are being told to co-operate, and Thomson has broken off talks with SBL on marketing the US company's minicomputers.

The government has also vetoed an agreement for French minicomputer manufacturer SEMS to link up with SBL.

Now Rocard has softened the threat by illustrating the sort of deal which the French government is keen to promote. He has singled out a joint venture between Harris in the US and Matra to build semiconductors in France.

Speaking at an award for regional expansion, which has gone to a Matra-Harris pilot plant at Nantes on the Atlantic coast, the Minister said: "One of the most modern production units in Europe for integrated circuits has been built at Nantes in under three years."

This has created 300 jobs with 1,500 planned within five years."

Westinghouse low price policy pays

by Claire Gooding

A LOW pricing policy has paid off for Westinghouse Management Systems, supplier of systems products to the IBM market.

Westinghouse's total European revenues rose 26% to £3 million in 1981, with the UK making the highest contribution at £500,000.

In a year of heavy investment in research and development for new products, Westinghouse managed to increase its total number of installations by almost 1,000 to 5,250, although many DP shops are looking twice at software spending.

This is partly because the company has stuck to a policy of selling at a low price in order to get as many users as possible, and partly because it identifies its markets carefully and pitches particular products at specific areas.

"It is not a fantastic growth in 1980 but the significant point is that prices have stayed more or less at the same level," said company president Eric Lataud, who describes the company's growth as real rather than inflationary.

The figures reveal that Westinghouse is making more on each sale, although prices have remained sta-

ble. That indicates the company is selling less in the way of small systems software and making the most of its traditional large system market.

The newest of its products, JCLMAN, does a specific job within a large installation. The JCL Manager gives the IBM DOS/VSE user an easier method of performing job control tasks. It is designed for online access, with automated documentation and foolproof error-handling.

"It's a complicated product, but the benefits it offers are quite simple," said Dave Hazlewood, UK manager. "The poor DOS user has been stuck a long way behind the OS man in terms of facilities available to him."

JCL is a three-part product consisting of a JCL library, a run-stream generator, and a procedure control language.

There is also an execution control language which allows decision making during the running of the job. According to Westinghouse installation takes a matter of minutes and the product is available at an introductory price of £1,750 until April, costing the full price of £2,750 after June.



HAZLEWOOD . . . "A complicated product with simple benefits."

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Advice on finding backers

by Maggie McLening
COMPANIES or individuals with sound ideas for technological developments but insufficient money to back them can now turn for assistance to a new finance consultancy company.

Formed specifically to help this type of enterprise, it is part of BFW Investments, finance brokers based in London's Little Britain.

Called The Consultancy for Innovation, Inc., it was started by Peter Woods, its managing director and former conference director for the Financial Times.

Many companies that are eligible for government grants in the fields of electronics, software, and genetic engineering do not apply for them, according to Woods.

"The majority of British companies and individuals do not want to apply for government help because they are afraid that it will interfere and monitor everything,"



WOODS . . . "Most don't apply to the government in case it interferes."

A team of technical advisers will assess the merits of ideas for projects submitted to Incob; and there will also be six associate executives on-call with experience in related fields such as financial analysis and marketing.

Based on the findings of the assessment, a decision will be taken on whether the client is eligible for any government grant, or whether funds from the private sector would best serve his interests.

US bulletin boards 'rival to Prestel'

by Maggie McLening
AN idea which started in America is developing into a rival for Prestel in this country. Free access computer bulletin boards, effectively a dial-up viewdata service, are becoming more popular among personal computer users for swapping messages and program information.

The first system in this country was set up by Fred Brown who owns a microcomputer shop called 3-Line Computing in Hull. He adapted the American networking program Forum-80 for use on his Tandy TRS-80 as a hobby, and now uses the system to set up details of programs for sale at his shop.

Word spread through the TRS-80 user groups, and there are now 11 bulletin boards in Europe; five in the UK, and the remainder in Holland and Sweden.

A major advantage of this system over Prestel is the cost: users may put information on the boards for the price of the telephone call.

'Micro in all secondary schools' now in sight

by our Parliamentary Correspondent
EXCELLENT progress in the Department of Industry's Micros in Schools Scheme was reported by Information Technology Minister Kenneth Baker during exchanges in the Commons.

Some 2,200 applications for microcomputers had been processed by the end of 1981, Baker said. And with the extension of the scheme to all secondary schools, large numbers of applications were expected this year.

Indicating his satisfaction with the success of the programme, Baker added that the government was on the way to reaching its objective of every secondary school owning at least one micro by the end of this year.

A total of £9 million has been allocated by the Department of Education and Science (DES) for the training of teachers, Baker said. He agreed that it would be useful to supply schools with microcomputers if staff were not

trained to use them.

Labour MP Tom Ellis called on Baker to add to the list of approved suppliers, currently Acorn and Research Machines, to allow other manufacturers to participate in the microcomputer scheme.

Baker answered that while Acorn and Research Machines would cover the extension of the scheme from this month, he would look at other manufacturers if the scheme were extended to primary schools.

Baker promised to pursue a suggestion made by Conservative MP Gerard Neale to study the use of computerised learning methods in primary schools through the telephone network.

He also said he would draw to the attention of the Secretary of State for Education, Sir Keith Joseph, the remarks of Labour MP John Garrett, who said that the work done by the DoI was being undermined by the DES cuts in the facilities available for training teachers in computing.



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Peachtree will plant its software in UK

by Boris Sedacca

A SMALL US software house which has suddenly come under the limelight as a supplier to IBM for its Personal Computer is setting up shop in Maidenhead.



HUNT: "We have 40 people dedicated to producing microcomputer software."

selling over 4,000 packages through dealers in the UK and Europe during its first year of operation.

The UK company will be headed by John Hale, previously managing director of Hale Computers.

Management Science America, the big US software house which specialises in applications software for IBM's mainframe range, bought Peachtree in June last year.

According to Michael Hunt, vice-president of international operations for MSA, his company did not know of IBM's plans to adopt Peachtree's software until negotiations began for Peachtree's acquisition.

Apart from the standard ledger accounting packages which Peachtree supplies, IBM has also adopted Personal Software's (PSI) VisiCalc financial modelling software. Peachtree's equivalent is called MagiCalc.

Hunt added: "The terms of Peachtree's agreement with IBM do not preclude us from selling



HALE: "...Heading UK operation."

MagiCalc in competition to IBM on its Personal Computer."

Hunt also claims to have a competitive edge against VisiCalc because MagiCalc has been integrated into the rest of Peachtree's package. Whereas one has to key in figures from scratch with VisiCalc for things like revenues and costs, this data may be pulled

in instantly off the files of other Peachtree packages and put into MagiCalc, he says.

"We have 40 people dedicated to producing microcomputer software which roughly translates to \$2.5 million a year spent on research and development, compared to \$13 to \$14 million a year on the mainframe side of MSA."

Govt to encourage the use of CAD/CAM techniques in industry

by Our Parliamentary Correspondent

MORE pressure came in the Commons last week for the government to increase its backing to computer users.

Further assistance to industry in using computer-aided design and manufacture techniques will continue to be reviewed by the Department of Industry, John Wakeham, Under Secretary of State for Industry said in the Commons.

But the Minister said that the primary responsibility for ensuring that CAD/CAM techniques were introduced into industry must rest with those who used them and those who used them.

The Department was encouraging a wider appreciation of the benefits that these techniques could bring to a number of manufacturing industries with a three-year awareness campaign which began this month.

He also reminded MPs that financial support for relevant research and development and pre-production orders was available within existing schemes.

Reports of plans approved by the Japanese Ministry of Trade

and Industry for Japan to take a "massive leap forward" in technology based on the increased use of computers and robots, quoted by Conservative MP Sir Viggers in support of a plan to change, innovation and technology in industrial practices.

Mrs Thatcher agreed that it was essential for the prospects for the very large technology and to be ahead in doing so.

She told Viggers it was vital that countries that had the outdated working practices and higher levels of unemployment. Those that had been successful in first to embrace new technology had the lowest levels of unemployment and high measures of productivity.

Since last April the government has received some 1,500 general inquiries from companies about the government's new scheme and 80 firm applications for assistance have been received. Kenneth Baker, Minister of Information Technology, stated in Commons written answer.

SOFTWARE FILE New contender enters System 38 market

A COMBINED international effort to create applications for IBM's database machine, the System 38, has brought systems house Pactal into an entirely new arena.

Although Pactal's own image is British-to-the-backbone, its parent, the international consultancy group PA, gives it access to multinational resources which may well provide it with the edge in the System 38 market.

There is now a rush to bring out applications for the System 38, which has been slow to fulfil expectations, mostly because only revamped System 34 packages were available. The machine was hailed as a revolutionary development for IBM, because it was designed around database concepts, with software the top priority.

The high-level language RPG III, along with inspired systems software, gave the programmer a power house of development tools but ironically IBM had to look to outside software suppliers

prepared to write applications from scratch for such an environment.

Pactal became interested because it spotted that the System 38, although a product of IBM's General Systems Division, could provide the kind of capacity and performance which blurred the distinction between mini and mainframe.

"We noticed that corporate subsidiaries and large multinationals were buying 38s," said Peter Andell, senior consultant at Pactal in charge of the System 38 project. "It confirmed that it would be a success in the kind of company we like working for, so we went ahead and installed our own."

Pactal's push into unfamiliar territory was helped by the fact that its parent PA had bought up several companies across Europe whose small systems experience was to provide much of the input.

One such, Erpege of Sweden, already had a Sales Order Processing system called Algo, and others, Tietolink of Finland and

AR Data of Norway, also had fingers in the System 38 pie.

In order to make the most of this international team Pactal formed a multinational and multi-linguistic consulting team, which draws on the various skills, such as accounting. The teams meet from time to time in various parts of Europe to hammer out a central specification.

The result, eventually, is a "core" package which can be tuned to the needs of any particular country.

In the UK Pactal has a small but enthusiastic team, working on its own System 38. "You can make this machine do anything you like," said systems analyst Susan Gale, who has been involved in building high-level general purpose tools to make things easier for both programmer and end user.

The team is working on three packages, the Algo Sales Order Processing System from Sweden, the Pactus General Ledger and the Pactus Maintenance Information System.



ANDELL: "...It will be a success in the company we like working for."

Desktop DBMS package enhanced

by Maggie McLening

AN enhanced version of the best-selling Profile II+ database management package for the Radio Shack TRS-80 Model III desktop computer has been released by the small Computer Company, Inc.

"Profile III+ allows non-programmers to create sophisticated applications - such as a complete personnel search system - in a fraction of the time it would take programmers using conventional languages," according to Howard Wolowitz, president of the SCC.

It also interfaces with the VisiCalc financial modelling program and the forthcoming Radio Shack SuperSCRIPT word processing program to give an integrated set of management information tools.

Up to five pre-defined report forms can be created and stored using Profile III+, and field values and totals can be calculated and inserted automatically.

Transpac bid to double computer connections

by Jack Gee

THE French data packet transmission network which will shortly be linked to the UK, is now connected to 125 data banks. Dubbed Transpac, it plans in 1982 to repeat its performance of last year in doubling computer connections.

Access to Transpac by banks, companies and government offices now totals 6,000 compared with 3,000 at the end of 1980. It will reach 12,500 by the end of 1982, the network organiser reported.

Transpac will also soon be linked to Japan. It has been connected with West Germany since last October, and has access to other Common Market countries and Switzerland via Burotel, as well as to the US, Spain and Portugal.

The UK's public packet network PSS opened last summer and is to be linked to IPSS, the older international version, in the next few months. So far UK-based users of IPSS, PSS and Burotel are separate groups with few of their members overlapping.

The French Telecommunications Authority has chosen Societe d'Etudes des Systemes d'Automatisation (SESA) to develop the second generation of Transpac. SESA had already been prime contractor for the network's first generation.

SESA, now the world's leading data network supplier, reports excellent results from its jointly owned American subsidiary SESA-Honeywell Communications Inc.



The 28,000 spares carried by this frigate need a sophisticated control system.

Navy stock control on DEC

by Andrew Thomas

DIGITAL Equipment has snatched the opposition by winning a contract from the Royal Navy to supply on-board computers.

Following 12 months' trial ashore and three months at sea, the contract was given to Digital to supply four pilot systems worth £385,000 over the next two years. The machines involved are FDP-11s and VT-100s with extended facilities.

A Royal Navy frigate carries over 28,000 spare parts, worth £1 million. The present manual stock control system is cumbersome,

and the Navy was looking for a computerised system not only for spares, but for general administration aboard ship.

The computers will be installed in the stores office amidships, which is the most stable part of the ship. No specialist training is required for the seamen who will operate the system via VDUs, giving them instant access to stores status and availability.

The shipboard environment is far harsher than that to which computers are usually exposed, so one of the first priorities was to ascertain whether or not the FDP-

11 would stand up to the extremes of temperature, pressure, vibration and shock, and the continuous motion of the vessel.

A development system is currently operating at Gosport, and the remaining three trial systems will be installed at the Royal Navy supply school at Chatham, HMS Dolphin (the submarine base at Gosport), and a serving ship.

Depending on the performance of the pilot system, the Navy has plans to install similar systems in a total of 83 ships, submarines and shore bases over the next 10 years.

Rivalry hots up in hotels

by Maggie McLening

USE of microcomputer systems in hotels and restaurants has fuelled the competition for a slice of the market, estimated at £100 million a year. MCR, which launched the 286 bar/restaurant system in December, has now added complete automatic hotel control and accounting systems to its range, challenging the ADP Hotel Services systems.

The new Modular Lodging System (MLS) automates reservations, guest registration, room management and guest account activities in hotels with up to 20 bedrooms. As the name suggests, the system can be installed in phases, starting with a reservation system (which is already in use at the Heathrow Hotel) and expanding to handle front desk operations.

It can also interface with existing back office hotel accounting system, which provides city ledger, accounts payable, payroll, general ledger processing and stock control.

Hardware for the system consists of twin processor units, with 512 Kbytes of memory and integrated disc units with 10 Mbytes of fixed and removable storage, which can accommodate up to 10 VDUs and up to 10 inquiry terminals.

Optional features of MLS allow for direct posting of telephone charges to guests' accounts and for entry of housekeeping information via a guest room telephone.

An enhancement planned for release later this year is the online posting of bar and restaurant charges directly to guests' accounts from the NCR 2160 system.

Cost of the MLS system, including software, is from £50,000, depending on the hardware chosen. On a smaller scale, the NCR 2950 guest accounting system offers front desk automation for hotels with up to 250 bedrooms for under £7,000.

This system comprises a 21 standing terminal with 21 programmable function keys, a slip, receipt and journal printer, and integrated digital cassette. Features of the 2950 system include inquiry for room management, automatic mail balance, currency conversion and automatic posting of accommodation and management charges.

Flat panel market 'will exceed \$500m by 1990'

by Andrew Thomas

A NEW report predicts that the market for flat panel displays for VDUs and television sets will exceed \$500 million by the end of the decade.

Four Japanese firms have already demonstrated flat panel pocket televisions, and several of these are expected to be in volume production soon. Flat panel technologies generally use less power than the traditional cathode ray tube, and enable the construction of lighter and more compact devices.

Some companies, however, are working on modified CRTs, which the internal layout has been rearranged to provide a relatively flat profile. Best known among these companies are RCA and Sanyo.

Other firms are developing large screen flat panel televisions to compete directly with projection televisions. The report states that these should be commercially viable by 1985.

There are already flat panel VDUs available, but according to the report most terminals will continue to use the cheaper CRT displays.

Suzanne Gray of International Resource Development, which prepared the report, says that flat panels will be used for portable terminals and executive workstations.

The IRD report predicts that by 1985 10% of all computer terminals will be using flat panel displays.

40% have eye strain in offices

by Maggie McLening

EYE STRAIN is the most common office ailment in companies using word processors, desk-top terminals and other electronic technology, according to a survey by Alfred Marks Bureau.

The next most common complaints are headaches, migraines and back pain, of which a third of those interviewed complained.

The survey found that 40% of office workers in the 194 companies involved had eye problems. That is a considerable increase on the results of surveys conducted in 1974 and 1977, and consistent with the growing use of VDUs.

Many companies said they were taking action to improve working conditions.

Unix rewrite undercuts the licensed version

US systems house Microware is out to capture part of the expanding UK micro market with a system called OS9, a cheap version of the Unix operating system.

Unix is the portable time sharing system billed to become the 16-bit standard of the Eighties (rather as Digital Research's CP/M dominated the eight-bit market). But the licence fee asked by its owner Western Electric has given rise to several rewrites of the system from scratch, which can then be sold at lower prices than the licensed versions such as Microsoft's Xenix.

Ken Kaplan, president of Microware, sees OS9 as a product with few limitations, and able to cope with applications not usually associated with Unix.

"It's been rewritten from scratch with versatility and portability in mind, so that it can support applications other than traditional time sharing and text processing. We are going for OEMs and industrial organisations."

Microware has provided full real time facilities and a complete kit likely to appeal to OEMs who are after a Unix look-alike.

These include Structured Basic, written by Microware to Ansi standard and dubbed BASIC9, and a

Pascal also written in-house. OS9 uses a version of the Unix language C, from Unix Version vii, and the micro Cobol compiler CIS Cobol from Micro Focus.

According to Kaplan, the main advantages offered by the support of languages like C and CIS Cobol is that they offer a bridge between the 68000, Motorola's long awaited next generation, and the 6809 chip.

The 68000 fits into a different slot in the price/performance scale - to be able to offer that sort of performance and the availability of development software which is portable is unique. It means that applications can be moved between the two.

Microware is trying to get the name and reputation of OS9 established in the UK, and is already looking for OEM agreements. One UK company, Positron, has chosen the system for its 9000 machine, due to go into production this month.

The entire system is written in 6809 assembly code. It may therefore have its market more clearly defined than some other Unix look-alikes whose market is threatened by the release of Western Electric's Unix update System II at very low cost for binary licences.

Search system points job hunters at right ad

by Maggie McLening

AN original idea in job recruitment is being pioneered by newly formed Datasearch Services. Instead of recruiting on behalf of employers, it circulates details of advertisements which have appeared in the Press to job seekers.

"The concept is not to find jobs in the same sense as a job centre, but to point people in the direction of publications advertising suitable jobs," explained Oliver London, a director of Specialist Software, the firm of consultants that developed the software for Datasearch.

One hundred and sixty local and national publications are scanned every day. About 1,000 descriptions of positions, advertised or processed per day, but the system has the capacity to cope with over 2,000.

Each subscriber is sent a daily sheet containing details of suitable vacancies and how to apply.

"It is rumoured that there was a system like this in the late '50s or early '60s, but certainly nothing similar in the last 10 years, because the price to technology performance ratio has not been right," said Tim Deakin, consultant to Datasearch.

Hardware used for the system is the 16-bit Alpha Micro 1051 Phoenix, supplied by Alpha Microsystems (UK), with 384 Kbytes of memory, linked up with eight VDUs and four line printers.

"We chose this system because the main thing is performance, and we can match people very fast," said London. "The response time on up to 32,000 items is a third of a second."

The project has taken almost four years to develop and has cost about £250,000. Subscription to Datasearch is £26 per month, but the cost is halved if the subscriber is still unsuccessful in finding a job after six months.

Every busy director deserves a personal assistant.



"But I've already got one... my secretary," you may be saying. True, but does she have the time to give you all the help you need?

Many secretaries are so bogged down with day-to-day correspondence, reports, minutes and so on they just don't have the time to be personal assistants as well.

We don't think a person in your position should have to worry about these problems.

So we've come up with the answer.

The Bitsy Secretaire. This is a specially developed word processor which can speed up all routine chores quite

dramatically, so your secretary will have plenty of time to give you all the help you need.

With a minimum of training she can produce letters, reports, minutes with much less effort.

And like our other systems, we've designed the Bitsy Secretaire with the secretary in mind.

It's simple to learn, has easy control instructions, even a special screen with brightness control that lets so your secretary can adjust it to suit herself.

So don't let your work get on top of you. The Bitsy Secretaire will give your secretary the time to be your personal assistant. After all... you deserve a helping hand.

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OW4/2/82

ADLER & IMPERIAL INFORMATION SYSTEMS

FROST & SULLIVAN SPRING SEMINAR PROGRAMME 1982

March
19-21 OFFICE AUTOMATION: ENTERING THE 1980s LONDON
22-24 PROCESSING AND MANAGING COMPUTER PERSONNEL LONDON
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28-31 APPLICATIONS AND USING COMPUTER GRAPHICS COPENHAGEN

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5-7 UNDERSTANDING AND USING COMPUTER GRAPHICS LONDON
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4-6 TELEPROCESSING SOFTWARE AMSTERDAM
5-7 SELECTING SOFTWARE PACKAGES LONDON
10-12 SELECTING COMPUTER DATA ENTRY SYSTEMS FOR THE 80s LONDON
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8-11 LOCAL NETWORKS FOR INDUSTRIAL APPLICATIONS LONDON



UK in first with micro-based flight simulator

A BRITISH company - Link-Miles of Lancing in Sussex - claims to lead the world with aircraft flight simulator, and is the first to bring out a simulator that replaces mainframe computers with a distributed system of microprocessors.

"To the best of our knowledge, we are the only manufacturer which has developed an architecture, applied it, and delivered it to a customer where it is in use," says the company's managing director Jack Davis.

He sees the world market for flight simulators driven by a need for greater realism and fidelity of simulation, lower acquisition costs and lower life-time costs.

He estimates that it will be worth \$1,250 million by 1985, and that increasingly complex aircraft and weapons systems will speed the move away from mainframes and minicomputers towards distributed microprocessor systems.

The first fruits of this trend are a simulator for the Bae Hawk jet trainer aircraft developed for the

Finnish Air Force and in use since October last year, and a vision system for other flight simulators, three of which have just been ordered by USAir. This \$3 million order is the first for the Image II system.

The Hawk simulator uses Intel's 8086 16-bit microprocessor. There are five in the cockpit platform of the simulator, looking after flight performance characteristics, radio and navigation equipment, engine functions, and auxiliary systems such as fuel, electricity and hydraulics. A sixth provides the instructor with the necessary feedback and the control of simulator functions.

So far the distributed simulator system can only be applied to light aircraft, not wide-bodied jets or advanced weapons aircraft with advanced weapons systems. However, the system is expandable up to about 14 processors, and with faster versions of the 8086 and more powerful processors like the iAPX 286 coming along, Link-Miles is sure that its architecture points the way ahead.

So far, the display used is only for dusk or night scenes, with a



Link-Miles' Geere, Davis and marketing director Peter Anley, who claim that their company is a world-leader.

The Image II vision system similarly uses several 8086s to provide a through-the-window scene giving realism and visual cues for pilot training. The display typically gives a view of particular airfields - showing landing lights, nearby towns and roads, hazards on the runways such as ice or other aircraft - in various weather conditions.

In a typical system, there would be 8086s to control the overall system, and deal with particular aspects of the airfield scene such as surfaces, light points and moving targets.

For both the Hawk simulator and the Image II system, the distributed microprocessor approach has had a good effect on software and systems testing. Costs for these were significantly lower, according to Davis.

Eight bits for price of four

PRICE competition at the end of the single chip microcomputer market is intense, with bit devices taking the lead in price-sensitive high volume consumer products such as games, telephones and home office controllers.

Now Intel has produced eight-bit micro, the 8020H, a device of on-chip ROM for 10,000 units, which it claims will halve the price of the eight-bit microcomputer used in many consumer products.

"The 8020H is a cost-effective alternative for design engineers presently using 4004s and 4040s in high volume products," says Joe Barnowski, Intel's marketing manager for microcomputers.

The chip is based on the architecture of the MCS-48 family, and uses a subset of the 8048's instructions.

COMPANY NEWS

City gloom over rising Star

HALF-WAY results at East London-based Star Computer Group have not done enough to lighten City gloom about the way the computer darlings of last year's Unlisted Securities Market are performing.

The company, led by entrepreneurs Jack Schumann and David Blechner, has pushed turnover up 45% compared with the same period last year, but that did not meet the excessive expectations of City investors.

Sales in the first half of 1980/81 were £1.1 million, compared with £1.6 million for the first half of 1981/82.

Profits for the half were 12% up at £201,000 compared with £179,000. In the middle of a recession this kind of result might be thought little short of amazing, particularly when the company has had the cost of its supplies, most of which come from America, raised 30% on the back of the rising dollar.

One reason for the high expectations of some City investors was that the price of the stock was pushed to a point where it was trading at 28 times the likely annual dividend earnings. Star, according to Schumann, has been investing heavily in new product. The company is adding new word processor, word processing and share registration packages to complement the extensive range of accounting packages supplied by the company.

Schumann and Blechner are confident that those packages will show significant benefits in the current financial year. And the company traditionally gathers in most of its profits in the second half.

Last year Star finished the year with a final profit of £740,000, which was one of the reasons City people were so keen on the shares.

At last — good news from Northern Ireland

WITH so much bad news coming out of Northern Ireland it's good to be able to report that in the computer industry at least things are not so gloomy.

Belfast-based Northern Ireland Business Systems, NIBS, one of the Province's better-known systems houses, has recently become the Data General distributor there and reckons to double its existing support staff from 11 to 22 over the next year.

The company was set up three years ago by ex-Burroughs salesman Jim Beattie and turnover has risen to £250,000. Start-up funds came from Beattie, his other directors, and a bank loan from Allied Irish Bank.

Initially the company provided back-up and software support service to Burroughs installations, and will continue to do so while it uses the Data General equipment to extend coverage of the market.

According to Beattie, NIBS aims to offer a locally-provided, locally-supported solution to the small businessman in Northern Ireland.

Traditionally the Ulster market has been serviced by companies whose main base was in England or even beyond. Because the market in Northern Ireland is not large only a few of the big companies like IBM and Burroughs have fully supported and structured organisations there.

ICL, formerly a big presence, never returned in full strength after its Belfast premises were bombed early in the current troubles.

But Beattie's systems director, Will McKee, reckons that this gives a company like NIBS a real opportunity to fill the gap. He says the market is about 100 systems a year. This puts a value on the whole market of about £20 million. Turnover at NIBS has doubled every year since the company started, says Beattie, and it is expected that this will continue.

Earlier this year the company took its development plan to the local enterprise development unit and McKee says that NIBS is likely to receive grant support. Local enterprise development

units in Ulster are small development authorities which make grants based on jobs created. At the bottom end of the marketplace, the company aims to provide the small business user with Apple machines running the Cobol packages developed by NIBS.

Beattie says that the micro end of the market in Northern Ireland is worth about £5 million, but he is worried about overkill. "Many firms in Northern Ireland trying to take advantage of the new technology are falling into the microcomputer trap and placing jobs at risk," he says.

He adds that too many products were being offered in the microcomputer boom without training and other support services.

"This results in many companies in the Province buying equipment without adequate preparation or knowledge and having to sort out the consequent problems... with possible job losses."

McKee says NIBS will soon announce a new super micro to fill the gap between Apple III and the smaller DG minis.

Gestetner profits down £10m

by Boris Sedacca

ALREADY reeling from the unsuccessful bid to acquire the ailing Nexos Group, Gestetner's profits have been slashed by heavy losses in its European operations.

The duplicator company, which has been looking for a suitable acquisition for some time now to enter new markets in office automation, has announced a drastic drop in pre-tax profits from £16 million last year to £6.2 million for its October financial year-end.

Turnover increased by £17.6 million over the same period to £298 million.

Dividend has been cut from 5.25p to 2.625p, and the price of Gestetner shares on the Stock Exchange dropped by 6p to 50p when results were announced.

A question-mark now hangs over Gestetner's takeover ambitions. The Nexos deal fell through partly because Gestetner did not want to have the 2200 manufactured and supplied by Logica, but wanted to build it itself.

ICL, under its new marketing-oriented management, was prepared to leave the manufacturing in Logica's hands. However, the Gestetner brothers have decided that they are optimistic about their prospects in 1982.

Meanwhile, Gestetner has announced that one of the companies in which it has a 20% holding is restructuring itself and its subsidiaries into three separate publicly quoted companies in the US.

Scope, a Virginia-based electronic equipment manufacturer, will distribute the shares in its two largest subsidiaries, National Controls and Repco, to its shareholders. A wholly-owned Scope subsidiary, WC Dillon and Company, will be transferred to National Controls.

Confidence in ICL

THERE was more than a glimmer of satisfaction at ICL this week when chairman Christopher Laidlaw announced that 95% of the recent rights issue of shares had been taken up by existing shareholders.

This amounts to a very substantial vote of confidence in the current management and its policies by shareholders who include some of the largest City investing institutions.



STODDART... His Blecra House group led the initiative to create Western Scientific.

Shot in arm for UK high technology

AN active week in UK small company and computer technology financing has been enlivened by the activities of Western Scientific. The company, which is both a holding company and an investment vehicle for a group of City institutions, has just bought the BOC aviation instrument subsidiary at Harlow and the industrial weighing business of Fisher Controls.

Western Scientific was set up in 1980 to concentrate on technology transfer from the US to Europe - so that the advanced technology being produced in the US would be bought on the basis of manufacturing licences and built in Europe, rather than being built in America and sold in Europe.

According to Richard Thompson, Western Scientific's chairman, the idea is not to have one-way traffic in technology. Western Scientific's first purchase was the silling Negretti and Zambra, based in Aylesbury, Bucks. Apart from having the manufacturing capability to exploit the licences and contracts provided by the US directors of Western Scientific, Negretti also has a useful portfolio of patents and in-house developments of its own, some of which may be exploited in the US.

Negretti and Zambra had been long established in instrumentation and had begun to invest in microchips when a decline in traditional markets for the company's products began to take their toll. In December, 1979, the company - which had a substantial NBS shareholding - sold off all the old mechanical businesses of the Negretti group.

The rump of the company re-focused on instrumentation and electronics, and now manufactures microprocessor-based instruments. The company introduced its first microprocessor in May 1976, a joint design with the Warren Spring Laboratory.

This early microprocessor was put into a process control system called NP MPC 80 which was driven by the company's own high-level language, Sezrol. This is still claimed to be the first all-British programmable micro-based process control system.

The Negretti Group was finally bought out in late 1980 by Western Scientific. The initiative to set up Western Scientific and the concept which the directors are implementing at Negretti and Zambra came from Mike Stoddart's Blecra investment group.

Guidance for managers

GREATER Manchester is to gain a training centre for businessmen wanting to find out what a microcomputer could do for them - thanks to Oldham systems house MAP Computer Systems, which is extending its activities into training.

Schooling recent reports of potential user troubles with salesmen, MAP's managing director, Glyn Rigby, says prospective buyers are desperate for experience as well as information and can be very suspicious of computer sales staff.

There will be no formal lecturing, but guidance will be readily available. Managers and accountants will see various micros in action.

Motorola divides franchises

WITH the 16-bit micro market in Europe looking to Motorola like a dominant board sales rather than components, the company has separated its systems and components franchises, appointing Thame Components as its first distributor solely for systems.

Thame, a subsidiary of Memec, will concentrate on the Exormec development system for the 16-bit 68000 processor and Veribus 16-bit boards, though will also sell Motorola's eight-bit systems and boards.

The Motorola products join development systems from AMD, Mostek and Syntek, giving Thame an unrivalled range, according to Memec chairman Dick Skipworth. He expects to sell

£330,000 worth of Motorola development systems this year.

Thame is the fifth distributor to handle Motorola's system products: four of the eight components distributors also handle them. The splitting of the franchises reflects the changing emphasis Motorola sees in the eight-bit and 16-bit markets. For eight bits, systems are sold to support components; for 16 bits, the components support the system sales.

"Board sales will be the key market for 16 bits - in the UK - over the next two years," says Motorola UK general manager Mike Alderson, adding that the only large volume market will be personal computers. "You don't

need 16 bits in washing machines."

European designs incorporating 16-bit chips are lagging behind those in the US by about a year, and not many use 68000s yet. Motorola is gaining ground over the Z8000 from Zilog, which it feels is its competition for new 16-bit business, but both have a long way to go to catch up with the likes of Intel and Texas Instruments in numbers of chips shipped.

Motorola has been shipping the 68000 in quantity for some time, and according to US research firm Datquest 36,000 units were shipped in the third quarter of 1981 compared with 14,000 Z8000s from Zilog in the same period.



ALDERSON... "Board sales will be the key market for 16 bits."

System has 50% more throughput

INCREASED throughput using a faster processor, new disc capacity and powerful input/output capabilities are the highlights of the 280A Supermicrocomputer, the CX5425.

Replacing the 280A processor in the two-processor CX502 with a 6 MHz Z80B, the increase in throughput has been achieved.

Compled with a 10 Kbyte cache buffer in the 280A-based disc controller, it gives better performance for up to three users than is achieved by any Winchester-based micro.

Technical director of the 16-bit-based company, Ivor Smith, estimates that disc performance is certainly equivalent to many 280A Winchesters, and will allow a 20 Kbyte program to be loaded from disc to about one second.

This will give reduced response times, and he sees applications in areas like word processing, where disc performance is important but the large capacity of the Winchester is not needed.

"Of all the prime computers (in the UK) we are the only one using the 280B," claims Smith. He adds that the architecture of the CX500 series, with multiple processors communicating along a bus, has enabled Transdata always to use fast memories, so there is no problem in matching the speed of the memory chips with the new processor.

The company expects to attract interest from end users and OEM system builders for the Supermicro machine, which joins a complete range of computers with upgrade potential from single-user desktop systems to multi-user hard disk systems.

Slump in semiconductor makers hits capital investment plans

THE worldwide recession in the electronics industry and the resulting depression in earnings of semiconductor manufacturing companies has had its effect on the sale of capital equipment.

According to VLSI Research's capital equipment outlook service, 1980's record shipment level of \$1,860 million fell to \$1,560 million in 1981, and is expected to show only a modest increase for 1982.

By 1985, however, it is forecast to reach \$4,470 million, driven by the demand for increasingly complex chips and automated manufacturing techniques.

The need for capital to incorporate technological advances puts strain on IC manufacturers, leading to a large number of acquisitions of semiconductor houses by large companies. Local European

firms found it difficult to remain competitive with US and Japanese companies operating internationally, the report notes.

Capital investment, including building and land, rose from about 9% of revenues in 1965 to 15% by 1980. This trend is expected to continue, and it is estimated that in 1985 capital expenditure will reach 25% of semiconductor revenues, despite the 1981 downturn.

VLSI Research's analysis shows that investment in capital equipment alone rose from 3.2% in 1965 to 9.9% in 1981 and will climb to 11% by 1985.

The main area of the equipment market is for wafer processing, followed by testing and assembly. Despite the general decline, a few sectors increased sales in 1981 over 1980.

Probing and handling equipment spending went up, with manufacturers trying to eliminate defective devices as early as possible in the manufacturing process, and shipments of nepping aligners (one of the newer types of lithographic equipment) increased.

The European Community, concerned at being left behind in the new technology race, recently announced support worth £24 million in 1982 for development projects with European firms producing capital equipment for semiconductor design and manufacture.

One hopeful aspect of the VLSI Research report is its identification of several European companies already making an impression on the US-dominated scene.

The TOTAL Answer

No1

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£1359 VOLKER CRAIG 404	£30	£795 TELETYPE 43	£45
£1223 MELBORDATA DT801-1415	£39	£1995 DIABLO 1850 RO	£94

Rentals from 1 day to 1 year

Quoted prices are for 2 year rentals

CW SHARES TABLE

Date 20/1/82		Index 87.86		Change +4.16	
Firm		London Stock Exchange		Firm	
1982	1981	1982	1981	1982	1981
High	Low	High	Low	High	Low
118	121	118	121	118	121
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120	123	120	123	120	123
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FOCUS



Anne Leeming

the Canadian company more than \$4 million in the red, ICL is

Great news for everyone

☐ ☐ ☐

THIS week's example of the strange things people say about computers was sent in by I. R. McCoubrey of East Horsley, Surrey, who wins £5.

One thing in our favour is that the basic "tool" of IT is English language. Even Japanese computers have to work in English.

Surrey Advertiser

VME/B scores with TP monitors

BRYAN R. D. PARLETT
Ash Green, Dartford, Kent.

You can do it without a machine

deal on the subject until it "times out" at the end of December, unless it gets overshadowed meanwhile by the Year of the Scout. I recently came across a reference to IT in one of Stephen Potter's Lifemanship books, in which IT was given as Income Tax.

ROY CANDLER
Long Eaton, Nottingham.

No Acorn until April

has been a snag in production, and that the huge amounts of orders have made a mockery of any planning, but the credibility of his company would be greatly enhanced if Mr Curry were to give the same story to me, a customer, as he has given to the Press.

C. R. DICKENS
Landford, Salisbury, Wilts.

HEC started an era

ware, it was a bit limited, but nevertheless the small band of users did remarkable things with it. An issue of *The Tabulator* in 1955 described how Esso was proposing to use it for planning the production of its Fawley Refinery, and at the Business Efficiency Exhibition in the same year its bridge-playing was the highlight of the show.

Viewdata interface for S100

S. J. I. LEE
Managing director
Lee and Goddard Ltd
Southampton.

Ciutware File by Don

The world leader in colour graphics has moved into its new UK offices!

These plus the rest of Ramtek's range of terminals, systems, monitors and colour hard-copy devices will be supported from the new offices.



DOWNTIME

Promised land—where energy grows on trees

Fast food

Music in the air

The burger weighs about five ounces and is said to contain all the protein, minerals, vitamins, carbohydrate and fibre necessary to keep a person on two feet.

Fast food sample

"Everyone should have one for breakfast," he says. "Then they can do what they like."

I'VE GOT ALL THE STUFF ON
INFORMATION TECHNOLOGY
YEAR. IN HERE SOME WILL BE.

Nothing serious

2966 red

Getting warmer

The other device is a remote controlled microprocessor from Japan which will start your car and heater — from a distance of up to 500 feet. It will have eight attempts at starting the car before giving up lest it flatten the battery.

It's a shame my old granddaddy isn't around to see this. For years he would place a little oil burner under his carburetor on a cold night to ensure first-time starting.

Map message

The map must be motivated by the motto: Know thy enemy as the back of thy hand.

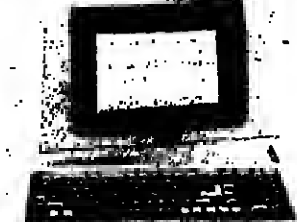
A dog's life

DOG-LOVERS are being invited to attend the Burroughs stand at the Info 82 exhibition this month to witness part of a worrying new propensity that salespeople have acquired.

There will be a bloodhound present whose legendary search and retrieval abilities are supposed to symbolise the similar abilities of Burroughs' new office system.

Chad

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KENYON... "Ten consultancy studies for European clients."

Why ops should always know when the next crisis is due

THE night shift has just gone home. The day shift is cleaning the peripherals — and the sleep from the eyes. Two of the most important batch systems are overrunning.

The shift leader receives an irate phone call from the user of one of the late systems:

"Where's my listings?"

"OK, we'll give your job top priority."

The shift leader replaces the handset. The phone rings immediately. It is the user of the second late system:

"Where's my listings?"

"OK, we'll give your job top priority."

How often has this arisen at your installation? Is it only resolved by the intervention of the DPM giving judgment in favour of the system whose manager has the most clout?

If so, then it is likely that your site has no effective monitor on performance or machine capacity.

Most large organisations have some semblance of standards for new and modified systems: maximum permissible disc accesses for each transaction, main store occupancy of programs, and so on.

But all too often, these standards are ignored or even deliberately flouted.

I have known systems to be submitted for vetting at the design stage which adhere to all the corporate standards only because the project manager has been less than honest about the number of disc transfers per message pair, or the number of message pairs expected per hour.

When the finished system is run the machine is severely overloaded, all the other tasks are delayed, and something has to be taken off to enable the most critical work to run reasonably.

Lack of foresight can cause machines to run out of steam. Again, no one person will usually admit responsibility for predicting when a hardware upgrade will become necessary. The usual turn of events is large-scale panic during which jobs will be re-scheduled in a last-ditch attempt to get the critical work out on time.

Eventually the required hardware is installed and the department can breathe again — until the workload builds up once more.

This type of amateurish occurrence could be avoided if there were one person or department solely responsible for the performance of the machine and the vetting of proposed systems. It is not enough to rely only on the project managers involved.

This department should be part of operations rather than systems. If your boss is also in charge of a project he or she may be tempted to twist your arm to smooth its acceptance, and you will feel obliged to help out your workmates. Don't forget it's always operations that gets it in the neck when the workload gets behind schedule.

The most important aspect of performance monitoring and capacity planning is that it should be a continuing process rather than a one-off or annual event. This key part of the DP department should be responsible for performance data collection, evaluation, reporting and planning procedures. Once established these will form the nucleus of a comprehensive management information system.

The data shown on the reports will naturally depend on the particular requirements of the site, but whatever the detailed information, there should always be a management summary of the most critical resources.

As a rough guide, this should include TP response times and numbers of message pairs by application, user program concurrency, the number and duration of batch and interactive jobs, disc traffic and the number of peak changes required, CPU idle time, operating system CPU time, mainstore occupancy, and communications processor traffic. Each resource should also have a percentile growth figure.

Performance and control technicians worth their salt will see to it that they are not presented with a plethora of figures each morning which require plotting on to a vast array of graphs spread around the office walls.

Computers are there to take the drudgery out of this kind of work, and it is only common sense to utilise them fully in monitoring their own performance. In showing trends and predicting future events, an operations database is of prime importance.

Once set up, the daily performance runs should maintain the database automatically, meaning that the best P&C people are always at risk from their own systems — if you build an all-singing, all-dancing monitoring and prediction package, the company can dispose of you and still get the necessary reports.

Having decided on what reports are required, the next problem is finding the data needed to produce them. Most operating systems provide an inordinate amount of performance information, which will require extraction and reformatting before it can be used (Thomas' first law of operating systems states that "The required data is never in quite the right format").

It is a good idea to build a discrete data collection and formatting routine, rather than coding it into the performance package itself. This means that if your organisation should install a new machine of different manufacture or architecture, only a new data collector will be needed.

If your responsibilities cover more than one machine, you should at least attempt to consolidate the performance reports into one document.

If your company is not in a position to set up a performance and

by Andrew Thomas

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PROGRAMMERS PAGE



Tridata directors Cooke (right) and Plackowski.

Ex-mainframers break into the micro market

WHEN mainframe programmers find themselves in a rut, some change gear to micros and drive off on a road of their own.

This is what two young men in Birmingham did, and so far their bank managers have been laughing all the way to work. As package software suppliers to micro users they pay themselves "roughly what contractors with comparable experience would earn", with the additional perk of a company car.

Bread and butter commercial software packages like sales ledgers are the main business, and there is no desire to cultivate new pastures — there is plenty of demand for straightforward business software on micros.

Bespoke work is anathema. "We handle in-house modifications to packages, otherwise we steer away from bespoke, because we can sell tea packages in the time we are talking about the design of a bespoke system," says co-director Mark Cooke.

The company, called Tridata, was established in 1978 after Cooke and Tony Plackowski, the other director, had met on contract for British Shoe. "I resigned after taking a holiday," says Plackowski. "We both found contracting dead-end and wanted something permanent."

Both men complain that contracting teaches very little and merely rewards, albeit handsomely, skills already acquired. But for them, contracting eventually proved open-ended rather than dead-ended. They had little starting capital, and so for six months they worked contract by day and wrote systems for micros by night.

They were entirely self-taught, but do not consider their particular kind of work especially difficult. "Most experienced mainframe people could get into micros easily enough," says Cooke.

Cooke and Plackowski began slowly, without a bank loan, and have since been wary of expanding too fast. "We did, however, have a friendly bank manager who allowed us overdraft facilities," he concludes.

The main problem about the US micro package market is, in Plackowski's opinion, that packages have to be written specially.

Tridata sells in South Africa, which raises the ugly question of apartheid. Cooke, who is black, feels strongly about it, but feels that so long as the software is not for military projects, there is no moral conflict.

"I haven't time to dwell on the negative aspects of being black," he says. "I have never felt inhibited and have found that no one cares so long as you know what you are talking about." He adds the qualifier that perhaps blacks are held back from promotion in larger organisations.

Recruitment is now done by advertising in the local Press and from Topsy people getting in touch. So far two Topsy people have been taken on, and Plackowski is pleased with their work, feeling that Topsy graduates come in for much unnecessary criticism.

Both men have worked hard for their success and still put in 12 to 14 hours a day plus Saturday work. Not that this is unusual when people work for themselves, but Plackowski reckons this has cost him his marriage as well.

This is an occupational hazard of small businesses. An answer is to have one's spouse participate in the business, but then, as an ex-colleague of mine discovered to her cost, the strain of spending too much time apart is replaced by that of spending too much time together.

Tridata produces general accounting packages for CP/M microcomputers, particularly Tandy. Sales are mostly made through the dealer market, and there is little attempt to reach the customer directly — a hopeless task, says Plackowski.

Marketing has been by word of mouth and display. The packages can be bought in Tandy computer stores, and in some others as well.

Products are all written in Basic. "All things Cobol go out of the window here," says Cooke whose school of thought teaches very practical values. It is hard to reconcile the views of the purists who refuse to have their children learn Basic lest it corrupts them for life, and those of the people of Tridata who satisfy a market for software plain and simple.

Tridata sold 1,100 packages for between £160 and £345 in 1981, which represented growth of 34%. Even better figures are predicted for 1982.

But Plackowski boasts of trying to limit Tridata's growth in 1982. He seems proud of being small, and fearful of becoming thin and stretched through too rapid growth.

Most sales are in the UK, but Tridata has established contacts in the Middle East and Africa. "We have not cracked the US yet, though," says Plackowski, who adds that there is a big market for British micro software there. "US systems software is good, but its applications software is poor," he concludes.

Each of the five vertical columns, five horizontal rows, and two main diagonals, turn to a constant of 80. The 25 numbers used in the consecutive sequence (but not starting at 1). See page 45 for solution.

Contract staff agencies can smooth your path to the sun

by Boris Sedaeca

WHEN times get tough, people start thinking about packing up their bags and emigrating to a country with better economic prospects and climate.

Skilled analysts and programmers are tempted to apply for emigration at the US or Australian Embassy, even though it can be a demoralising and time-consuming process.

In the case of immigration into the US, an individual acting on his own can face delays of one-and-a-half years or longer before he can get his "green card", an immigration visa which will allow him to remain and work in the US indefinitely.

Contract agencies, on the other hand, can get people over quicker, although on a temporary basis. The VLI Group, one of the leaders in the field, has been working from offices in New York and Los Angeles for over five years.

Tony Vickers, international director for the VLI Group, explains that the amount of time taken to process applications varies in the nine autonomous immigration districts in the US.

"We can normally get an application processed in one or two months because most of our business is project oriented for periods of about one year, although it is not unusual for projects to overrun to 18 months in some instances," said Vickers.

The success of VLI's operations has encouraged smaller operators to get in on the game.

Times have never been better at International Management Consultants, a contract agency operating from an address in Hollywood's shiny Sunset Boulevard.

IMC's clients in southern California are clamouring for staff to operate their installations, while programmers and analysts in the UK are beating a path to IMC's door as a prelude to gathering up their families and possessions and emigrating.

individual and stamps his passport with the H2 visa, which is normally valid for one year up to a maximum of three years.

The H2 visa is a non-immigrant visa issued on the understanding that the job is temporary in nature. Rogers argues that companies will not make a commitment to keep a job open if the process takes more than three months.

"We approach officials on the basis of national interest or in the interest of the US economy, because we can argue that lack of staff stifles growth. If we could not prove that demand outstripped supply, or if there is any doubt in officials' minds about any application, then they go through the whole investigative process.

"Therefore, we have to take the cream of applicants, because we can only short-circuit the process if we can prove that the individual is highly qualified."

"We have over 100 years of combined experience on immigration law in our firm, which will handle up to 1,000 open cases at any one time. It takes time to build up experience and information on the way to process applications. But people can apply on their own — they do not need a law firm to do this."

Anne Hawkes, director of Computer Software Services, claims to have interviewed about 100 people in the UK over a period of two weeks for IMC. Of these just over 30 have been taken on.

"If the applicant is not single we have to interview the whole family because they will have to adjust to the new situation. The individual will not only have to adjust to a change of company but also to a cultural change, so he is interviewed on his adaptability too," she said.

"At the moment there is a shortage of programmers and analysts for IBM, Burroughs and NCR mainframe equipment, as well as Digital Equipment minicomputers. People change jobs more frequently in the US and programmers spend about nine months on average in any one job."

"We can guarantee personnel for at least one year and we normally contract for up to 20 people at a time. Our clients are mainly interested in Cobol programmers, but there is also a demand for Fortran and Assembler programmers, software development staff, and even geophysicists."

Rogers adds: "We find it better to shift whole families because if individuals have families to go to after work, it helps them to adjust more readily. If they do not stay on the job because they find it difficult to adjust for any reason, not only do we lose an employee, but we also risk losing a client."

"We do not actually pamper them but we help them every part of the way to their new job. Our employee relations department looks after things like housing because credit facilities are difficult to establish in the US. We also help them to obtain driving tests and car licences, provide free tax and legal consultation, access to doctors and dentists, and schooling for children."

"It is a different type of life in Los Angeles — people are very casual and the climate is good. What is more, people there are fond of the English."



IMC president Al Rogers and director of CSS, Anne Hawkes.

The individual will not only have to adjust to a change of company but also to a cultural change

IMC is represented in the UK by Computer Software Services, which does the initial screening of applicants. CSS is all set to compete with the big boys such as Lambda, Knight and the VLI Group, the more established names in the UK brain drain.

IMC claims to be able to process H2 visa applications, the US equivalent to the British work permit, in three months.

The company was set up three years ago by Al Rogers, president of IMC. He is also legal administrator at a specialist law firm called the Immigration Clinic to which IMC is affiliated.

Rogers explains that staff are brought in by a process of labour certification.

"Firstly, the US Department of Labour screens the individual to determine whether he will displace an American national from a job. This process takes 30 days by means of 'block certification'."

"Then the Immigration and Naturalisation Service (INS), the body responsible for approving H2 visas, investigates the individual to verify that he has a good character, that the job actually exists, and that he has the necessary qualifications — all in a fluid application."

"This takes a great deal of time because the INS is understaffed, but we can also process this in around 30 days. Finally, the US Embassy in London interviews the

PUZZLER

21	10			
9			26	15
	8			
27				

IN this week's problem you are given seven numbers of a 5 x 5 magic square, and asked to determine the placements of the other eighteen.

Each of the five vertical columns, five horizontal rows, and two main diagonals, turn to a constant of 80. The 25 numbers used in the consecutive sequence (but not starting at 1). See page 45 for solution.

Midlands firm to train local school-leavers

FIFTEEN school-leavers in the West Midlands area are to get computer training from Dudley-based SysCom Computers, under the government's Youth Opportunities Scheme, YOPS.

The youngsters, who were selected by staff at the Careers Office in Dudley, Wolverhampton and Tipton, will train for 13 weeks and the course will show how compu-

ters work and how businesses can make use of them.

The business side will look at office procedures and business systems. The trainees will be familiarised with computer terminology and learn how to operate certain items of equipment including word processors.

The course is being supervised by the Dudley Careers Office.



Janice Walden has been appointed user base manager at CTL's Southern Region. She was previously in sales and support with ICL. Marc Strallen becomes area sales manager for the company, covering North London and parts of Essex and Middlesex. Strallen is also ex-ICL, as is Mark Roberts who joins CTL as area sales manager covering Heris, Bedfordshire, Suffolk, Norfolk, Cambridgeshire and part of Essex.

John Moore has been appointed district manager of ADP Network Service's financial district. He was previously Northern region sales manager with Unilever subsidiary UCL.

George Sebastian has been named vice-president, international sales and marketing, at Vector Graphic Inc of California. He joined the company from TRW Datacom International, where he was marketing manager.

Marc Calzavara has been given responsibility for sales in the Eastern area for Computer Associates. He has been with the company for three years, until recently based in Milan.

CONFERENCES

THE most recent developments in Office Automation and Integrated Information Processing Support Systems is the theme of Frost and Sullivan's latest seminar, to be held at London's Cumberland Hotel from March 17-19. It aims to describe office automation concepts and capabilities, discuss its uses and identify its benefits, and review some of the more advanced products on the market. It is intended for those involved in office automation planning, business communications, word processing usage,

electronic mail and information systems design. Fee is £360 + VAT. Details from Frost and Sullivan, 104-112 Marylebone Lane, London W1N 5PU. Tel: 01-486 8377/9.

COMMUNICATIONS 82 is intended as a "total communications exposition," according to its organisers, Tony Davis Communications. Products on show range through systems, equipment and components used in communications including transmission, switching and terminal equipment and associated products and ser-



Winner of Data General's Student of the Year Award is Mike Fleming, a senior programme leader at the computer development division of Barclays Bank in Forest Gate, London. Presenting him with part of his prize - a selection of wines and food - is Data General's Carol Duncan, who is UK and Ireland area customer training manager. The Award is made annually to the most outstanding student selected by lecturers on DG's customer training course.

Mike Deeks has joined Digico from Vero Systems, where he was a sales engineer. He will take on mail and Quadtone sales in East Anglia.

Graham Lockie has joined Verimont Research as regional sales manager for Northern Europe. He was previously a sales executive with Centronics.

Susan Frampton has joined Butel Business Systems as London office systems manager from Data General, where she was systems engineering branch manager.

John Richardson has been appointed national sales manager at Codex. He joins the company from Rascal-Milgo where he was Northern Regional manager.

Internal promotions at MSA

SOFTWARE company MSA has filled four managerial posts by internal training and subsequent promotion.

Michael Duff, who joined the company in 1979 as a systems consultant becomes divisional support manager; Martin Fairburn, also a former systems consultant has been promoted to payroll/personnel support manager; Martin Judd, formerly technical support manager, Europe, at MSA's Belgian head office returns to the UK as support services manager. Another former systems consultant, Chris Stoker, who joined the company in 1980, has been appointed divisional support manager.

Peter Underhill has been appointed senior sales executive for CTL's Convergent Technology microcomputer systems. He will cover the North of England, and will be based in Salford. He previously sold distributed systems for QI Europe.

Ray Dennis has been appointed marketing executive at the flight controls division of Marconi Avionics. He was formerly engineering manager of the company's flight automation research laboratory.

Barry Barker has been appointed sales manager at CPU Peripherals, after several years in design engineering in the electronics industry. Marketing manager is Mike Ayres, who has 16 years' experience in the computer industry.



Senior analysts

PRIME Computer is continuing to expand user support facilities with the appointment of two senior analysts.

Jeremy Thallon has joined the company's government district, to provide support for users in central government and national industries. He was previously a systems executive with ICL, working on systems analysis mainly for users in wholesaling, retailing and distribution.

Peter Beadlow will be responsible for users in the Southern district. He will specialise in communications, including the company's Primetec interactive working system. Beadlow previously worked as a systems analyst at Northern Telecom.

New director

CAMBRIDGE based Informatica Transfer has elected Nicholas Clayton to its board of directors. Clayton was research assistant to director of the Department of Aerial Photography at Cambridge University between 1973 and 1979.

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DIARY

FEBRUARY 9
The electrocure office. BCS Croydon branch. Maple Room, Fairfield Halls, Croydon. 7.15.

Unix. BCS Harlow branch. Norfolk Room, Saxon Inn, Southern Way, Harlow. 7.30.

Visit to IBM Greenock. IDPM Scottish branch. 7.30.

Information technology - the next five years, current developments and their implications. IDPM W. London to Oxford branch. Bull Hotel, Gerrards Cross. 7.30.

FEBRUARY 10
Exotic graphics. BCS Belfast branch. Department of Computer Science, QUB, Botanic Gardens, Belfast. 2.30.

Kidney Unit visit. BCS Bristol branch. Contact PD Hemming, Engineering Computer Centre, Rolls-Royce, PO Box 3, Filton, Bristol. Tel: 093871 ext 904.

Database design and operations. BCS Database Group. Room G6,

New Engineering Block, University College, London. 2.00.

The future for Prestel. BCS Kingston branch. Board Room, Kingston Polytechnic, Penrhyn Road, Kingston-upon-Thames, Surrey. 7.15.

Image processing. BCS Leicester branch. James Went Building, Leicester Polytechnic. 6.15.

Microelectronics on merchant ships. BCS Newcastle branch/ERE. Ellison Building, Newcastle Polytechnic. 6.00.

Ada. BCS Sussex branch. Lecture Theatre AS1, School of Engineering and Applied Science, University of Sussex. Palmer, Brighton. 7.30.

Microprocessor systems and small businesses. BCS Teesside branch. Teesside Polytechnic, Borough Road, Middlesbrough, Cleveland. 7.00.

The weather business, by Jack Scott, BBC Weatherman. Joint meeting of Institute of Quality Assurance and BCS Wolverhampton.

branch. Connaught Hotel, Wolverhampton. Tickets £25. Contact: A. J. Powell, Dept of Computing and Mathematical Sciences, The Polytechnic, Wolverhampton. 7.30.

Catholic fault location. IBSTE Canterbury College of Technology, New Dover Road, Canterbury. 7.30.

FEBRUARY 11
Bridging the gap between the developer and end-user. BCS Study Group 5. Staff Training Department, Prudential Assurance, Mezzanine Floor, Main Prudential Building, London.

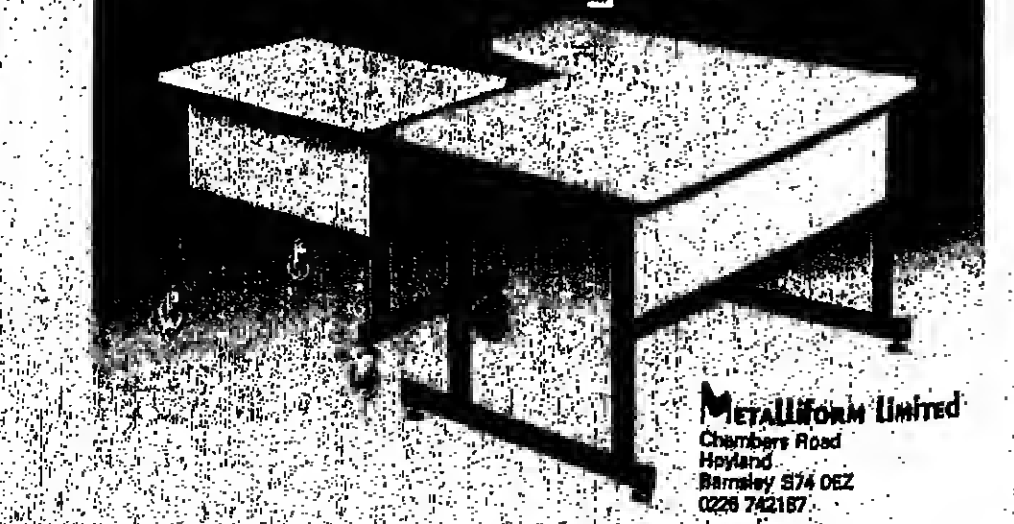
System sizing. BCS Guildford branch. Queens Hotel, Lynchford Road, Fernborough, Hants. 7.30.

Small and personal computer systems. BCS Merseyside branch. Tandy, 16 Lord Street, Liverpool. Details from William Gaskell at (051) 235 3236. 6.30.

School links with industry. BCS Oxfordshire branch. Staff College Lounge, Oxford Polytechnic. 7.45.



visual display unit tables by METALLIFORM



Systems may soon be talking to each other . . . Frank Taylor reports

The systems interconnection standard nears completion

FOR some time there has been a pressing need for standards which will enable systems to talk to each other.

The development of standards for Open Systems Interconnection (OSI) which began in the UK in late 1975 has now progressed to a point at which the definition of an architectural structure or model for the standard is now complete, and has been registered for international standardisation.

More recently, attention has been given to the definition of standards for services and protocols consistent with the model, which will provide a basis for initial open systems. In this context services are the facilities offered by the conceptual layers of the model, represented in real life by either communications hardware or low and high level communications software.

This model is shown on Figure 1 as a layered protocol structure. The management of liaisons and certain services does not fit into the layered structure, although negotiating information cascades up and down the layers and one management layer initiates negotiation.

If a negotiation is successfully completed, then an information transfer between two layers can occur. Liaisons may be of several types - interactive, one-way transfer or Remote Job Entry (RJE) working. When this operation is completed, the liaison is then terminated so that information, data or completed work is not lost, and termination itself has to be negotiated when all jobs are correctly completed.

Examples of such layered structures may be found with airlines using the International Civil Aviation Organisation's network, weather forecasters with World Weather Watch, and the US Department of Defence's Advanced Research Project Agency (ARPA). ARPANET was the first operational packet switching system between multiple hosts and performs the same functions as OSI, although it uses different protocols.

The services provided are concerned with negotiating the transfer of information, establishing a path along which it can flow,

Applications	Provides an intersystem link which is transparent to users when established
Presentation	Pre-negotiated terminal dialogues and printing protocols, etc.
Session	Establishment, commitment, recovery
Transport layer	Sequencing, flow control, priority (security?)
Network layer	Routing/switching
Data link layer	Procedures + data layout, Establish, maintain, release
Physical	

Figure 1. OSI structure: protocol layering.

controlling the flow and terminating the existence of the path when the transfer is complete. Protocols in this context describe the controlling dialogue which initiates, terminates and governs use of the services just described.

Creation of an OSI connection involves despatching initial data responsible for negotiating possible transfer paths and characteristics between two or more systems, and despatching information down a conceptual layer structure in such a way that information required by each layer is "peeled off" as it reaches that layer. This is shown in Figure 2.

Functions within the interlinked system must align - as shown in Figure 3. Alignment is vital, especially if the linked systems have different primary functions. There are seven layers. Typical data processing work functions at the applications layer on the left-hand side of the diagram, which represents the host computing facility.

The centre of the diagram represents the switch or transport service which provides the intermediate communications mode, with additional functions in microcode such as delayed delivery. This is the domain of the common carrier. No data processing takes place here.

The right-hand side represents the terminal elements of a system with typical text and facsimile transfer system.

Some of the issues highlighted by this approach include a specification of the amount of data which may be exchanged during the negotiation phase, whether or not it should be "expedited" - that is, accelerated so that it overtakes normal data being transferred along the same or parallel paths - and the security of negotiations, when sensitive information is involved and it may be desirable to keep negotiations secret.

During the actual transfer of data, security is important and the transformation of information into forms other than "clear text" (human readable text) within layers 6, 4 and 1 is being discussed, as is the technology of encryption/decryption used to protect information. Many workers feel that the 64-bit key used by the now well-known NBS/IBM algorithm is not adequate for many sensitive transfers, and longer keys are required.

The activities of the CCITT, the body which collectively brings together the world's Post and Telegraph authorities (PTTs), are also attracting attention. Some of the newer services specified by CCITT, such as teletex and

videotex, broadly map on to the OSI model at various levels.

For example, teletex has got a transport service within its specifications (S-70) and another standard for control of the creation, operation and release of inter-system "sessions" which corresponds to the functions of Layer 5 (CCITT Standard S-62).

What is not clear is whether it would be possible to map directly from CCITT's S-62 standard to ISO's Transport Service standard, and vice versa, and similarly whether mapping from ISO upper level standards to CCITT's S-70 transport standard will be possible and permissible.

Many workers feel that CCITT members will not favour such cross-links at intermediate levels, and it may be necessary to handle particular transfers using wholly ISO or wholly CCITT standards and structures.

Similar circumstances apply to the videotex field - videotex terminals promise to offer a low-cost method of presenting information using low-cost terminals. However, it is far from clear whether videotex standards such as the new CEPT standard T/CD 6-1 will map directly on to ISO session layer standards and vice versa. Lower down the conceptual structure it is unlikely that the relatively simple control features associated with videotex transfers, normally via the Public Switched Telephone Network (PSTN), will satisfy the requirements of the ISO network layer.

Many issues are yet to be resolved. However, once these issues have been resolved, and the protocols and services standardised, the user dialogues used to drive systems software will be essentially standardised. System software with standard interfaces and functions will then become implementation dependent, rather than differing in dialogic and structure, and the emphasis, so far as vendors are concerned, will be on effective implementation rather than on unique features - which today lock many users into particular manufacturers' offerings.

Charles Bachmann, chairman of ISO's TC 97/SC 16 Committee, responsible for OSI work, believes that system software will become a commodity when that point is reached and furthermore, real-time will be built into many systems by dividing processing across many distributed systems which will automatically communicate.

Other benefits will be reduced training costs, eased interconnection of foreign peripherals to any particular system, and decoupling of user programs from today's conversion costs since the environment within which they operate, at the application level, will be standardised.

This should result in a high level of protection when applying to an investment in costly and complex application programs, and a fall in the cost of their application, since it will be possible to transfer them to any compatible environment and spread the investment across a wide user base.

By that time Open System Standards should be completely buried within firmware, and simply be a transparent facility which the user will treat in the same way as he today treats a motor car - something he drives, without necessarily being concerned with its detailed technology or performance.

The author will be one of the speakers of the joint NCUR/IBEX Symposium entitled A Better Way to Communicate, to be held on February 9. He is principal of Systems Technology Consultants in Knutsford, Cheshire, and immediate past chairman of the British Standards Institute's Committee DPS/20, now OIS/16, which is currently progressing UK work on OSI.

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Nation of shop-keepers takes to computers

IT is almost impossible even to have breakfast without becoming aware that bar-coded packaging is widespread. Traditional packaging such as Tate and Lyle's golden syrup has been "improved" by the addition of a bar code.

The European Article Numbering Committee reports an increase in source-marked food items in 1980 of 430% over those sold in 1979. And 1981 showed no slowing down in this trend, despite the recession.

It is now economic to install so electronic point-of-sale terminal in an independent owner-occupier shop. Bob Leggett of TAL Computer Division has fully computerised Richard Anderson Ltd, TAL's retail outlet in Leighton Buzzard, Bedfordshire, which sells cameras and other photographic equipment.

Richard Anderson, which has a staff of four, is pleased with its

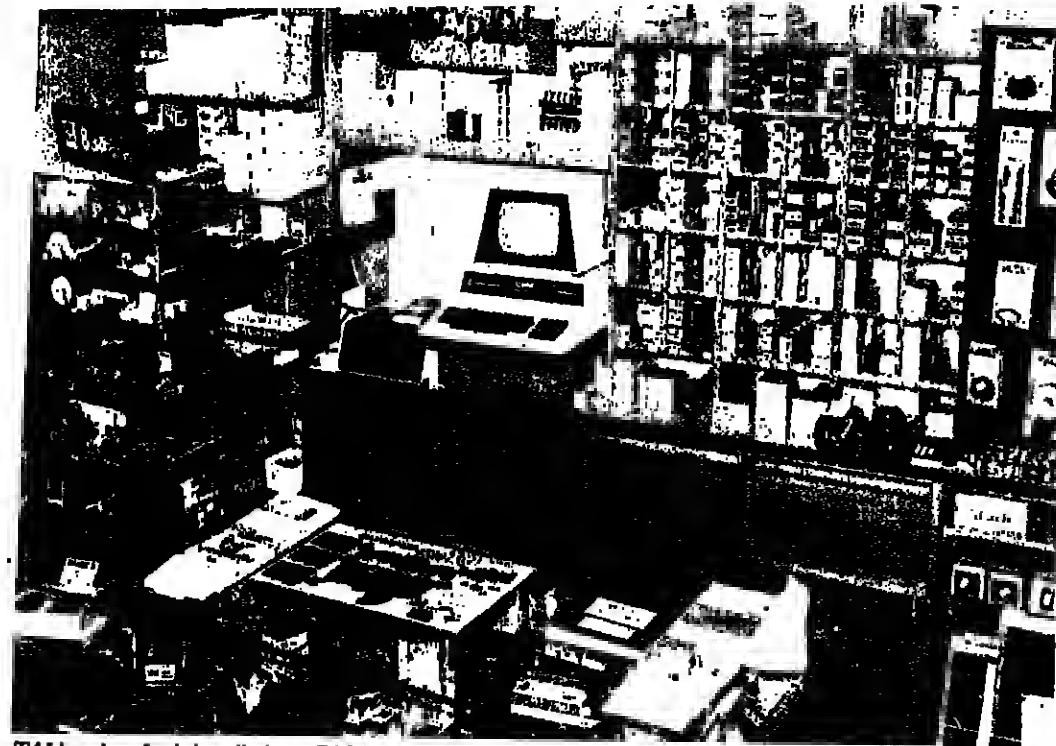
Pet-based PoS installation.

Leggett justifies the investment simply - a normal electronic cash register costs almost as much as his diskette-based computerised system.

He costs his investment as follows:

4016 Pet	£
Single diskette drive	500
Fully-interfaced till drawer	400
40 column Whymark printer	250
Software	100

In addition to the normal shop transactions, he has systems to handle films left for processing, monthly accounts, customer receipts, delivery notes and credit details. All the data is diskette-based and he is able to do end-of-day, end-of-week and end-of-month reconciliations easily, together with substantial detail if necessary. He can cater for customers who



TAL's point-of-sale installation at Richard Anderson Ltd.

hand in films and then lose their ticket, customers who want refunds or who want to open an account.

TAL Computer Division is a small but reasonably well known software house in Bedfordshire,

especially for its Pet-based financial packages which it has sold to 10 or 12 businesses in the district.

Software Sciences, part of BOC International, is another Bedfordshire PoS pioneer, but on a larger scale. It also deals with the

small end of the retail trade and recently sold a computer-based PoS system to Hudson's bookshop, which has a staff of six in Coventry.

Its Duct system allows it to carry out normal sales transactions. Unlike Richard Anderson, where every transaction has to be keyed in on the keyboard, Hudson uses OCR "A" wand input. Once the data is entered, a full stock control system and a full analysis of the shop's trading position by topic is provided - for example, it will indicate whether gardening books are getting more popular. A trading history by publisher as well as the usual analyses of credit, sales in date, the particular location of books in the shop and the date when the last copy of a book was sold are also available.

In addition, the system can output the value of the books that are on order as well as those that have not arrived. It can provide a better service to the customer, too, because if the customer does not know the exact details of a particular title the shop assistant can automatically match the imperfect version against all of the 25,000 stock items that the system has on a disc.

There is room for a further 40,000 titles should they feel they need it.

The publishers have just started to incorporate bar codes as part of a book's binding - they now use the ISBN (International Standard Book Number), complete with check digit, to produce a unique bar code to form part of the book's cover.

This development has provided Software Sciences and Hudson with a problem because bar-code readers are cheaper and more reliable than OCR readers.

A current OCR book label produced by Hudson shows the ISBN, the price and the location for the book on display in the shop. A bar code which merely shows the ISBN would be a poor substitute, especially for the consumer who has to remember a price when he is called on to pay for it.

The OCR labels that Hudson uses are produced on the Software Sciences system as soon as the books are delivered. A local Z80 microprocessor is accessed via a converted Hazeltine VDU and the system acknowledges the new stock if it has been ordered. In this way, over or under deliveries are catered for, and the exact number of book labels is then automatically produced. The checkout statement that the customer receives provides more detail than a standard cash register slip.

As the till is also linked to the Z80, the stock is controlled continuously through the shop.

Helen Scanlon, the shop's manager, explained that the arrival of the computer helped her staff to devote much more time to serving customers. For example, she had just sold a copy of Celtic Folklore Volume 2 - which is not a best seller - to a customer who was just interested in things Celtic.

Another customer the previous week knew just what he wanted. Guido Cantelli, portrait of a man, published by Tandy Press, and required those details to be entered into the system. In this was a found from a separate microfiche system.

Files are stored on a local Mbyte Winchester disc drive and the day-to-day computer operation is designed to be straightforward.

The staff at the other branch of Hudson in Coventry are keen to get their own system. But it costs over £20,000 and that means they have to be sold to pay for it.

Another supplier of PoS terminals designed for the smaller shop is MSI. This is an American company and has made substantial sales there. Its design, like Software Sciences, allows for manual or keyed data, but it has no host computer. Instead, the shop needs to have a telephone link to a central computer in order to process data which has been collected.

Each terminal possesses enough intelligence, however, to allow the user to review previous entries and to amend them if necessary. Storage is in solid state memory which reduces the terminal's weight considerably. Because they are so light they have been put to many uses apart from PoS. Applications that prove most popular include order entry, unit stock control and movement analysis. Independent shops in the DIY, fashion and hardware sectors of the industry have proved the most satisfactory.

One company, Calsdan Information Systems, has provided the central computing facility which the MSI terminal needs by setting up a Pet computer to receive Post Office transmitted data.

Now that at least one system is economic for every shopkeeper, the consumer can look forward to a further high street revolution to rival the supermarket revolution of the 1950s.

It is slow (4,000 characters in two minutes) but cheap - prices start at £795 although a typical system would cost about three times this amount.

Two other products, both British, are also available to the independent shopkeeper. They are Data Recognition's Despatch 3 device and a newcomer called Microfin, and both are conceptually similar to the MSI terminal.

Dataport has recently secured a £500,000 order from BAT for gathering data from sales representatives, but Microfin has only been available for some three months and is currently waiting for its first major contract.

Microfin has developed a package, called The Retailer, to provide a computer-compatible record of sales transactions, shelf-stocking, stock taking and data transmission to the host computer. It has developed communication control programs which operate at up to 120 chps on Data General MicroNovas or Nova 4s, depending on the number of shops.

The Microfin terminal clips into a cash register to provide it with the necessary intelligence to make it a point-of-sale terminal. It can be readily uncoupled to make it available as a portable data capture terminal. As with the other terminals, input is by keyboard or OCR or bar-code wand.

Consumer reaction seems favourable to the arrival of new technology in the retail trade. Now that at least one system is economic for nearly every shopkeeper, whether he is in the high value/high volume end or the low value/low volume end of the retailing spectrum, the consumer can look forward to a further high street revolution to rival the supermarket revolution of the 1950s.

Nicholas Benwell is a lecturer at the Cranfield Institute of Technology.

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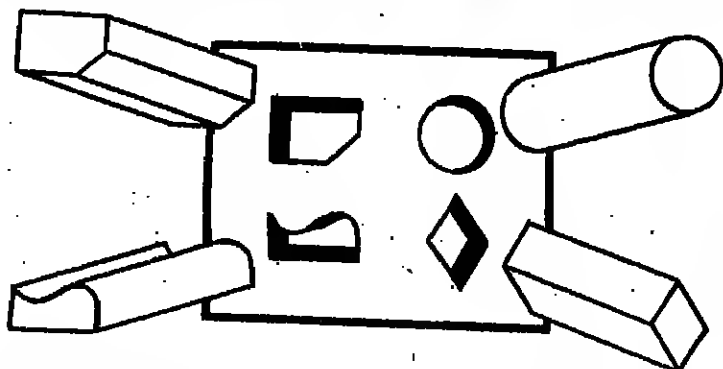
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Some DP beings are human

Make a Success of Microcomputing in Your Business. Pannell, Jackson, and Lucas. Enterprise Books. £4.95.

THE trouble with computer books is that many of them appear to have been written by computers. At last someone has realised that swallowing technical information is easier when it is washed down with jokes, and in producing such a text has managed not to trivialise the content. It is a spirited attempt to prove that some DP beings are human.

Generously illustrated with panel cartoons (one of which is reproduced here), the book is intended for the bewildered businessman who isn't quite sure what he wants from a microcomputer, or what it will cost him, but is convinced that to own one is a good thing.

The authors unravel and examine irrational fears, explode myths and do their best to ruin the one-off microsystem salesman's most fertile pitch: the ignorant.



"We mustn't feed those questions to the computer. We require answers that are evasive and ambiguous - I'll deal with them."

The existence of unbiased sources of information is also a fact of which businesses may be unaware, and these organisations and their locations are described. To arm the businessman in his system-hunting sorties there are checklists of tricky questions.

To ensure that the potential customer can then understand the

answer to his casually-tossed Motorola question, there is a glossary of technical terms in the back of the book which could probably be committed to memory fairly easily.

Enterprise is a new publishing house and can be contacted at 79 Oswald Road, Manchester, M21 9QT.

Maggie McLening

Standard for students of software engineering

Software Engineering Economics. Barry W. Boehm. Prentice Hall. 767pp. £24.40.

THIS text should be of interest to teachers, students and practitioners of software engineering. It would also make healthy reading for computer science teachers and students.

The book consists of an introduction (with case studies, goals of software engineering), a quantitative model; fundamentals of software engineering economics (cost-effectiveness analysis, multiple decision analysis, dealing with uncertainty, risk and the value of information); the art of software cost estimation (software cost estimation methods and procedures, the detailed constructive cost model, software cost estimation and life-cycle management).

It would be difficult to praise this book too highly. It is certainly a milestone in software engineering student textbooks. The only student text which is remotely in the same class must be Shneiderman's Software Psychology, and that is a complementary text, not a competitive one.

Dr Boehm has managed to combine his gift for conveying key software engineering ideas with his extensive practical background as a software engineering manager at TRW Systems, and his recent one-year break as a guest professor at USC. I predict that many teachers will plan new courses around this book and that it will become a standard in teaching software engineering.

This text has what most other literature in the software engineering and computer science area lacks: a quantitative engineering approach to all subject matter. The approach is further enhanced by its practical and realistic handling of the material.

Dr Boehm is the open-minded teacher par excellence. He makes no attempt to hide weaknesses, even with his own ideas.

In addition to his mastery of purely technical matters, Dr Boehm reveals a strong and realistic sense of the practical importance of the

human factor in systems design and particularly in the software producing organisations.

One detail that impressed me was his consistent treatment of "iterative enhancement" possibility in the software life cycle.

The topics for further research and questions at chapter-end were especially stimulating as learning aids.

Dr Boehm has so confidently criticised his own work that he has little to add to the discussion. My initial inclination was to remain all that while this text is heavily inclined towards and, in the case of a given system, the system architect does have the option of designing the system architecture to meet given cost, schedule, power and risk constraints.

"Ask not what the cost will be, but how you can design for your cost constraints" is my motto. Dr Boehm quietly ends this note with criticism by his concluding chapter on options to programming as productivity controllers.

Tom Gill

Guide through the technology jungle

Planning for the Office of the Future. Edit. Alvin Simpson. Gower. £7.95 (paperback).

DESPITE the abundance of new technology available for the office, little information has been forthcoming to the average businessman apart from sales brochures.

Impartial consultancy advice can be more costly than the equipment itself, and it is partly this realisation that led to 1982 being designated Information Technology Year. This book is the first of a series entitled The Office of the Future, which aims to be a guide through the technology jungle - hence with forthright, jargon-free salesmen - at a reasonable price.

Simpson presents a carefully-chosen selection of articles ranging over the whole spectrum of office automation, written by specialists in each field, and encompassing such notably problematic areas as trade union attitudes, and the planning of full-scale computer systems - which should merit a book to themselves.

There is always a danger that this type of book will degenerate into a series of advertisements for the companies whose representatives have supplied a chapter, but

Simpson appears to have avoided this trap relatively successfully.

The only section which may be guilty is British Telecom, who wavers between being an excellent source of detail about its equipment and a coy commercial flourish.

A section by Rex Winkler of Intel does much to unravel the confusion surrounding terms and figures here and in Europe, and to dispel the myth that British Telecom is still leading the field. Ideas that he gives for cutting the cost of using a Prestel may well encourage more companies to participate or at least experiment at a cheaper rate than they could have envisaged.

One minor criticism of this book - and there may be time to rectify this for others in the series - is the dreary cover. Sepia tones in a depressingly unimaginative picture of terminals and desks give the impression that the book was written circa 1950.

Nevertheless, this is certainly worth buying, and it could save the average business some expensive mistakes, and at the back of the book is a useful list of suppliers and an even more useful list of technical terms.

MM

Straightforward look at systems analysis

Basic Systems Analysis. Alan Dancin and Don Yeates. Pitman. £5.95 (paperback).

IT would be a mistake for anyone to assume that they could acquire all the knowledge and expertise necessary for a specialist job by merely reading a book, and yet it is hard to find many aspects of systems work omitted from this volume.

The authors say in the introduction that it is designed to be used as back-up to courses in systems analysis, particularly the one run by the National Computing Centre, but the clearly organised content makes it equally suitable for an instant reference book.

Standard procedures, such as finding and interviewing a client, are described in great depth, with accompanying checklists to build up the learner's confidence. Samples are given of flowcharts using different standard symbols, the various number notations, and other

standard NCC documentation. Methods of monetary reconciliation for financial systems are explained, together with suggestions about how to recover when an error has been detected - usually a task left to the hapless maintenance programmer.

One area of systems design that is always neglected is security and controls, but this book devotes a whole chapter to the subject. Surprisingly, no mention is made of interactive or database systems, now increasingly common, whose methods of back-up and recovery are necessarily more complex.

For a book which goes into a lot of technical detail, Basic Systems Analysis is straightforward and easy to read, and would be ideal for students and non-DP managers who want to see how the implementation of a computer system will affect them.

MM

Kevin Cahill reports on a fast-moving company set up in Britain only a year ago by the Finnish mini manufacturer

Rush of orders spurs Nokia UK in Europe

A CLUTCH of orders, including three standalone VDU units for BBC radio newscasters, has given the new year a bright start at Nokia UK.

The UK company is a subsidiary of one of Finland's largest conglomerates, Nokia Oy, and opened shop in London early last year.

With the first major network based on the company's Mikko microcomputers sold to British Telecom just before Christmas; a standalone system using a 10-Mbyte Mikko 308, the biggest in the range sold to Ilex; and 40 terminals, including two word processing systems, on order, managing director Mattei Heikkila is optimistic.

He says that the company will be announcing many more orders within three months, and he is currently actively recruiting staff to cope with the business.

Nokia and the Mikko computer are of course much better known in the company's home base, Fin-

land. In fact, it is something of a surprise to most observers to discover that a country as small as Finland, with a population one-thirteenth the size of the UK's, should have a computer industry at all.

But the electronics division of Nokia is the oldest electronics company in the country, having been set up in 1960 by Kurt Wickstedt, the current vice-president of the electronics division. He proudly guides visitors to a graph plot on his Mikko desk terminal which shows ten years of consistent 25% to 30% per annum growth in the electronics and computer division of the company.

This is in sharp contrast to the fortunes of the parent company, Nokia Oy, which is primarily a wood, heavy electrical and rubber firm. As such it is prone to the sharp recessionary swings in the international economy, particularly those of the last decade.

Nokia Computers is currently active in Canada, Sweden, Ger-

many, the UK and the US, according to Wickstedt.

He further noted that encouraged by the results in the UK, Nokia would be making a very aggressive drive on Europe, including Holland and Switzerland.

The company is strong in three areas - banking, point of sale and minis - which have given it a large home user base with which to develop.

There are over 1,500 Mikko microcomputers scattered around the branches of Kop Pankki, one of Finland's biggest banks.

The country is thinly populated and this distributed population drove Nokia into real time systems very much ahead of many companies (though one exception was its neighbour in Sweden, Data-sab).

Another major system which helped increase Nokia's expertise in real time and online processing is the one it developed for the 470 shops of the State-controlled liquor chain Alko.

The first machines in the Alko network were installed in 1974/75, the year after the company started producing the Mikko I, which was designed by Heikkila.

Each Alko shop has a point-of-sale terminal which records sales and products sold by a numbered code. Inside the office in each shop is a Mikko microcomputer which registers the sales, controls the stock and plans the re-order levels.

The system is extremely simple and produces output for the local shop manager in the form of a tally roll summary of activity in the branch.

Re-order details and stock levels are transferred to central warehouses at regular intervals over the phone lines.

Heikkila, the product manager for the PoS group, says that while the company cannot be a mass supplier of terminals, it is focusing on the overall design of the workstation and the system as the path of future development.

The implication is that Nokia will concentrate on the electronics and the software, but rely on an outside contractor, possibly a Japanese supplier, to build the actual PoS unit.

The company is known to be well advanced with a series of new microprocessor boards based on the latest chip technology, includ-



Anja Rouhainen, manager of Nokia's PCB plant which will produce over 15,000 sq ft of locally designed PCBs.

ing 64K chips. These new boards are expected to form the core of the company's triple product drive, in PoS, banking systems, and micros and terminals.

To back up the development drive Nokia has built and recently started PCB production at a new 170,000 sq ft facility at Cilo, near Helsinki. Local electronic design experience is tapped directly and the company uses Racal Redac computer-aided design equipment with Calma software to eliminate the long delays inherent in PCB production.

Prior to the opening of the new facility, which is one of 10 such factories in Finland, the company had many of its printed circuit boards produced in Norway.

The plant, which has cost £5 million so far, and is scheduled to be in full production this year, is managed by Anja Rouhainen, who says that the company now employs 20 layout designers and 70 people in the actual PCB production.

Backing up this team is a group of 25 engineers, chemists and physicists, representative of the range of skills needed to keep a full PCB line going.

The eventual target of 15,000 sq ft of boards suggests that Nokia has plans to grow substantially in the next few years.

ICL is planning to use 75,000 sq ft of PCBs for what will be a £1 billion company soon, so Nokia would seem to be targeting a turnover of about £200 million, 100% up on its current £100 million.

Behind the PCB plant lies a connection with Silicon Valley. Nokia is the 58% shareholder in a

small California micro-chip company called Micronas. The other shareholders are Finnish TV company Salora and the electronics group Aspo.

The primary function of Micronas is to help the Finns gain experience of advanced chip design, using the latest techniques available.

Within the Micronas connection Nokia has established a stake in another Californian venture called Micro Power Systems. This company is 60% owned by Japanese company Seiko and specialises in CMOS and bi-polar analogue to

digital converters, for use in modems and similar equipment.

The problem now, according to Micronas president Pauli Immonen, as he sat looking into Finland's snow-laden winter, was how to get his engineers back from the ashline of California.

Finally, Matti Heikkila says that Nokia will be investing heavily in software. He has already begun to use UK software experience in conjunction with the Nokia software subsidiary Sofplan, to develop and redevelop application level software with the Mikko system.



A customer buys his bottle of Finlandia vodka in a State-owned liquor store, and one of 1,200 Nokia terminals scattered around the 470-shop chain records the sale, orders the stock and prepares the re-order schedule.

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Interactive terminal has colour graphics

TO meet the growth in the microcomputer market for both personal and business use, RCA has introduced an interactive data terminal, the VP-3301.

Available from the Alpha-Numeric Division of Norbain Displays, the terminal is said to be suited to a variety of industrial, business, educational and personal applications requiring interactive communications between user and computer.

The terminal features standard RS 232 asynchronous interconnect, flexible membrane key switches with aural feedback, high noise immunity CMOS circuitry for hostile environments, programmable and resident character set and reverse video facility for single character or multiple character emphasis.

With a baseband video output that can be directly connected to a 525 line colour or black and white

video monitor and 625 line under development, the VP 3301 offers a terminal with technical features designed to keep in the forefront of a growing market, says Norbain.

The character display format, 40 characters by 24 lines or 20 characters by 12 lines, is software selectable. Each character or all characters may be displayed in one of eight colours (or grey scales on W display). Display background may be one of eight colours (or grey scales). There are 125 resident displayable characters or the user may define his own from Greek letters to playing card suits.

Aural feedback is by means of a built in tone generator which can be programmed for end-of-line bell, error messages or even music.

Norbain Electronics Ltd (CW), Norbain House, Arkwright Road, Reading, Berks. RG2 0LT. Tel: (0734) 864411. Telex: 847203.

Electronic typewriter and terminal combined

DESCRIBED by Duplex Communications as "the electronic typewriter that is also a communicating terminal," the Oetel 121 is now on the market.

This comprehensive peripheral has a 4K character memory with battery back-up and an integral text editor. It is also claimed to be a true KSR with standard features for OS use.

The Oetel 121 will link up with most micro, mini and mainframe RS232 computers and can also produce telex tape from a remote punch unit as well as accepting telex tape reader input for fast telex message handling.

It will link up with another Oetel 121 to transmit and receive data from a remote office, and may also be used as a typewriter when not required as a terminal.

Installation is simple and the Oetel 121 is adaptable to most business situations, it is claimed.

Duplex Communications (CW), 2 Leire Lane, Danton Bassett, Nr Lutterworth, Leicestershire. Tel: (0455) 209131.



Data Recognition's evaluation kit for the Dataport 5 hand-held micro.

Kits for under £1,000

A RANGE of evaluation kits (with prices starting at less than £1,000) has been announced by Data Recognition for its battery-powered Dataport 5 family of portable electronic offices.

The Dataport 5, a compact programmable microcomputer-based data capture device, incorporates fully customised alphanumeric keyboard data entry facilities, an integral 32-character display, 132K of character storage, and a unique full-duplex V24 high-integrity data communications capability which, says Data Recognition, permits in-

terfacing to almost any computer, and downloading program loading, via a modem.

It is styled like a pocket calculator and can be carried in a briefcase. Its applications lie in marketing and sales, field service engineering, distribution monitoring and control, inventory and stock auditing, production and quality control, van sales, meter reading, maintenance engineering and the like.

Data Recognition (CW), Unit 18, Suttons Industrial Park, Earsley, Reading, Berks RG16 1AZ. Telephone: (0734) 664577.

Support for IBM printers

AN adapter, the Model AS12, has been added to Tesdata's Hyperchannel high speed networking system. It is the second in a series of remote device adapters and is designed to support the interconnection of high speed IBM printers to the Hyperchannel network.

The AS12 allows 1403, 3211 and 3800 printing systems to be placed at distances of up to 5,000 feet on a local network, and up to 25 miles (via A710 link adapters) from the user's central computer with minimal loss of performance. The printers operate as if they were natively attached to the data channel and essentially provide a channel extension to allow the remote placement of locally attached peripherals.

The AS12 follows the Model AS10 remote device adapter which supports remote attachment of local IBM 327X terminals and tape drives on Hyperchannel networks.

Tesdata Ltd. (CW), Tesdata House, Hatfield Road, Slough, SL1 1RL. Telephone: (0753) 71961.

PRODUCTS-2

UK launch of Philips message switching family

THE Philips DSX-40 family of message switching systems has been launched in the UK by Philips Business Systems. Designed to automate traditional telex operations, DSX-40 can carry text and data traffic. It is intended for use by those companies with as few as two telex lines who are seeking to update and improve their telex operation, and larger multinational concerns which are looking to establish networks and integrated systems.

The microprocessor-controlled system can handle up to eight telex lines and 32 ports for access to the system. These can be office teleprinters, teletypes, word processors or other data terminals, which can be located in one building or throughout regional offices.

Each of these ports can have satellite terminals. The system operates in two modes: Dialogue — where communication is in real

time, like the conventional telex; and store-and-forward — where information is stored in the system's memory and forwarded as and when necessary.

Many of the ports which can be linked to DSX-40 have no common language and operate at different speeds, so the system has a speed and code conversion facility. This enables the transmission codes and speeds of incoming messages to be converted as necessary and forwarded without operator intervention.

All these facilities are designed to improve the efficiency and speed of the telex and to provide optimum and economic utilisation of telex lines, says Philips.

Philips Business Systems (CW), Communication and Control Division, Cromwell Road, Cambridge CB1 3HE. Tel: (0223) 245191.

Software development station has 64K RAM

THE Mostek Software Development Tool is available from Celdis at £2,289.

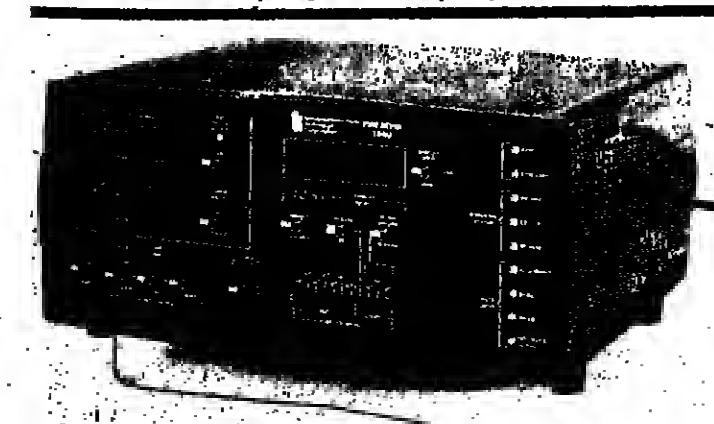
Housed in a cabinet measuring 188 x 483 x 540mm and known as the Mostek Matrix-80/SDT, the system employs standard Mostek MDX boards and comprises a 4MHz 280 processor with appropriate interfaces, 64 Kbytes of RAM and one eight-inch single density floppy diskette drive providing 128 Kbytes of online disc storage expandable to 512 Kbytes.

The SDT is intended purely as a

software development station and so does not support in-circuit emulation. It is supplied with Mostek's FLP-DOS operating system, which has been modified to support disc copying and disc formatting on a single drive.

CP/M will be available as an option. Also included is a Z80 Macro assembler, a linking loader and standard editor. A full screen editor, for use with approved video terminals, is available as an option.

Celdis (CW), 37 Lovelock Road, Reading, Berks RG3 1ED. Tel: (0734) 586191.



Firebird 1500, portable digital error analyser.

Data error analyser

THE Firebird 1500 data error analyser is the first product in a range of data communications test equipment to be marketed in the UK by Codex for Telecommunications Technology Corp (TCC) of Maryland, US. It costs about £3,000.

It operates on data rates of 300 bps to 10 Mbps, while internal clocks include all the standard rates from 1200 bps to 56 Kbps. The unit generates and accepts eight standard data patterns, and performs arithmetic, timing, display and interface functions.

Firebird's interface for the RS232 output printer is incorporated within the unit. An integral self-test capability is included as standard. The IEEE-bus can be added as an optional extra. Other options include a thermal printer and magnetic tape data logger.

Firebird 1500 can be used for most data circuit testing applications, says Codex.

Codex (CW), 105-107 Lansdowne Road, Croydon CR9 2BN. Tel: 01-680 8507.

Iris expanded for OEMs

AN addition has been made to Micro Consultants' Intelligent Remote Instrumentation System modular multiple microprocessor-based monitoring and control facility.

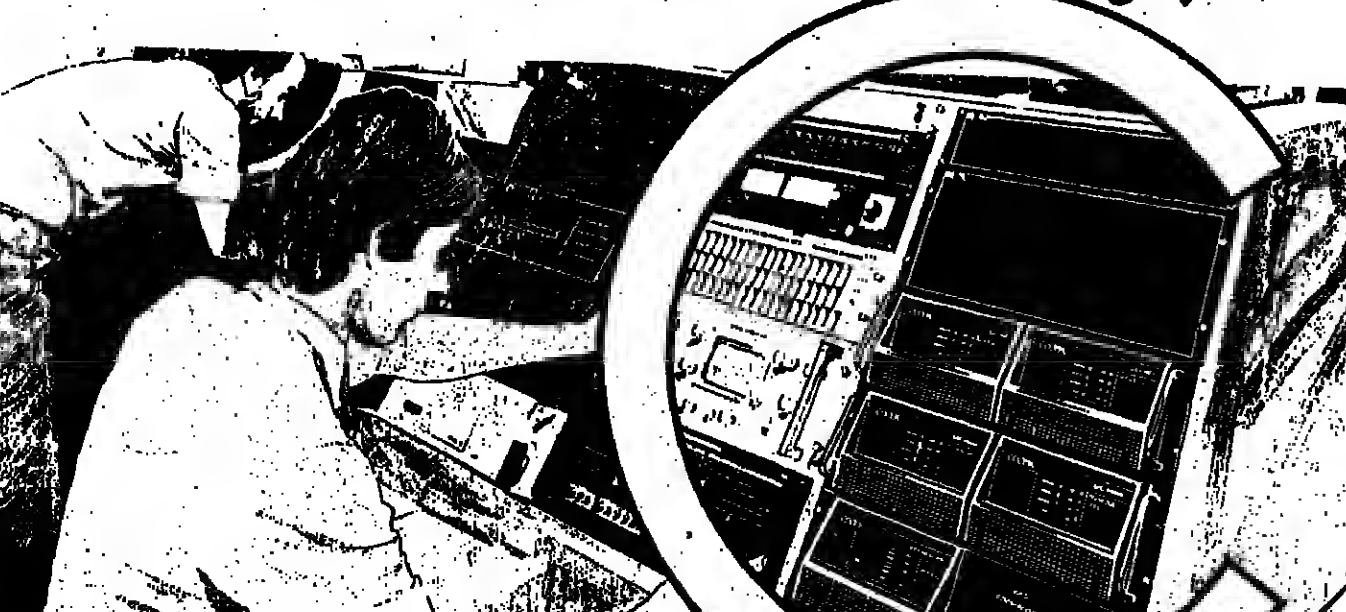
Designated Level O, the system now comprises the I/O hardware of the standard Iris range with a parallel interface for DEC minicomputers. Designed for use in industrial and research laboratory environments, Level O forms an expandable measurement

and I/O front end for DEC OEMs and users with existing computer facilities.

Iris Level O front end hardware can be configured to provide for any mix of random or group structured digital and/or analogue channels from as few as 32 on a small pilot project, to 1024 in a larger processing environment.

Micro Consultants (CW), Kenley House, Kenley Lane, Kenley, Surrey CR2 5YR. Tel: 01-668 4151.

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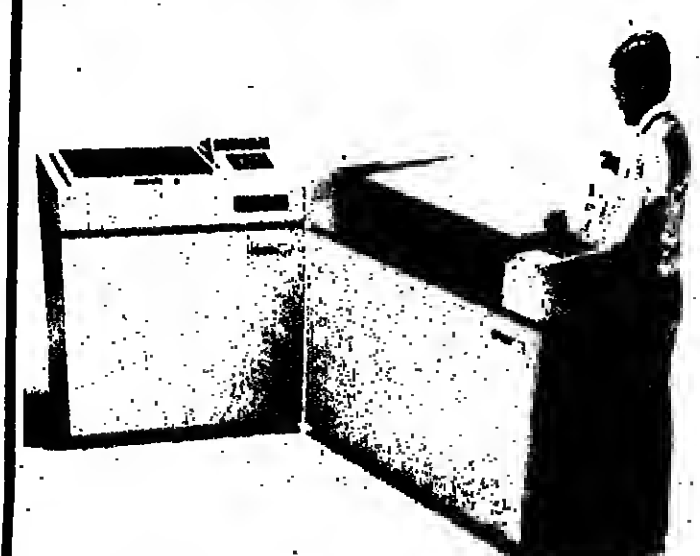
The LSI 96/V.29 conforms with the International Standard CCITT V29 recommendation and Codex compatible mode using Codex's unique QAM modulation. Normally operating at 9600 bps, it will fall back to 7200, 4800 or 2400 bps to maintain operation when the line degrades. Yet it is compact, lightweight and very reasonably priced. You can obtain complete details merely by writing "LSI 96/V.29" on your letterhead or business card and posting it to Codex (U.K.) Limited. Or, of course, by telephoning.

Codex provide a complete range of integrated communication products, including Statistical Multiplexers, High, Medium and Low Speed Modems, Intelligent Terminals, Network Control and Management Systems, Data Security Systems, Voice Digitizers, Technical Control facilities, as well as a broad range of network enhancement products.

Codex (U.K.) Limited, 105 Lansdowne Road, Geydon CR9 2BN. Telephone 01-680 8507.

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Calcomp's Model 5500 plotter (right), designed for CAD/CAM, and the Model 953 (left).

'Big step' in plotting

GRAPHICS systems manufacturer Calcomp has announced two additions to its line of pen and electrostatic plotting systems — the Model 953 vector-raster controller, for use with both types of plotter, and the Model 5500, a 36in wide, high resolution plotter/printer.

The company says the Model 953 represents a major step forward in plotting technology as it is the industry's first vector-to-raster controller capable of driving both pen (vector) and electrostatic (raster) plotters.

The significance of this says Calcomp is that it eliminates the need for separate vector and raster software in the host computer, separate vector and raster processors or separate vector and raster plot files for given plots.

Calcomp claims that the 953 will be particularly appropriate for the growing number of instances, for

example in CAD/CAM and mapping, where both electrostatics being used for the rapid output of check plots and the pen plotter for final high quality archival drawings.

Prices for the Model 953 start at about £17,000.

The Model 5500 represents the top of a range comprising seven different models for 11in, 22in and 36in wide output. It has been designed for applications where the requirement is for the very high speed output of large-scale drawings, such as those required in oil and gas exploration, mapping, LSI and VLSI electronic circuit design and other CAD applications.

Calcomp Ltd (CW), Cory House, The Kings, Bracknell, Berks. RG12 1ER. Tel: (0344) 50311. Telex: 848949.

Addition to range

AN addition to its Stabilise range of line voltage conditioners is announced by Claude Lyons Ltd. The LVC-65 is designed for use with personal computers to ensure trouble-free operation by regulating the supply voltage and removing damaging voltage spikes, transients and electrical noise.

The LVC-65 is fitted with a 3-core input cable, 13A socket outlet, mains neon indicator and fuse protection, as standard. Claude Lyons Ltd (CW), Hoddesdon, Herts EN11 9EX. Tel: (09924) 57161.

Wider printer interfacing

NEW versions of the latest Centronics 6080 printer family with different built-in interfaces are being offered by Bytech. Initially the interfaces will allow connection of the 600 lpm printers to Data General, DEC and IBM equipment.

These printers are being called the LP Series, and after delivery will be commissioned and fully supported by Centronics' own field service organisation. Bytech Ltd (CW), Unit 57, Suttons Ind. Park, London Road, Earsley, Reading, Berks. Tel: 0734-61031.

'Soft' VDU emulates other terminals

THE Dataview Displaymaster, a Z80-based "soft" VDU terminal that can be user-programmed to emulate most other conventional products, is available from ISG Data Sales.

It has a detached keyboard, extra-wide green phosphor display, 132 and 80 column format, 16 soft programmable function keys, 16 Kbytes of display memory (over 8 pages), screen highlighting, block mode, line graphics, screen editing numeric keypad and 128 ASCII characters. To emulate another terminal a set-up map is displayed and options typed in on a menu basis. The set-up characteristics can then be stored in non-volatile memory. Alternatively, the set-up conditions can be down-loaded from the host computer.

ISG Data Sales (CW), Unit 9, Fairacre Industrial Estate, Dedworth Road, Windsor, Berks. Tel: Windsor 57955/56.

Protek Electronics (CW), 115 Alderney Street, London SW1V 4HE. Tel: 01-834 3602.

'Quadruple' memory for desk-top

MEMORY of 256 Kbytes is available on a single board for Hewlett-Packard's 9826 series desk-top computer from Protek. The new board offers greater memory capacity using fewer card slots, claims the company.

Each WKBP-4 board provides four times the capacity of the 64

Kbyte standard boards, so the user can plug in an ample amount of memory without tying up more than a small number of the computer's eight card slots.

For example, you can use HP's ROM-based Basic, which takes two slots, and one or two WKBP-4 boards for 256 Kbyte or 512

Kbytes of memory and still have four or five slots free for RS232, I/O and peripherals.

The price is £1,400, delivery is two weeks and the product is warranted for a full 12 months.

Protek Electronics (CW), 115 Alderney Street, London SW1V 4HE. Tel: 01-834 3602.

NCC Training Courses 1982 is the complete guide to formal training from the UK computing industry's most experienced independent provider of courses.

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NCC Training

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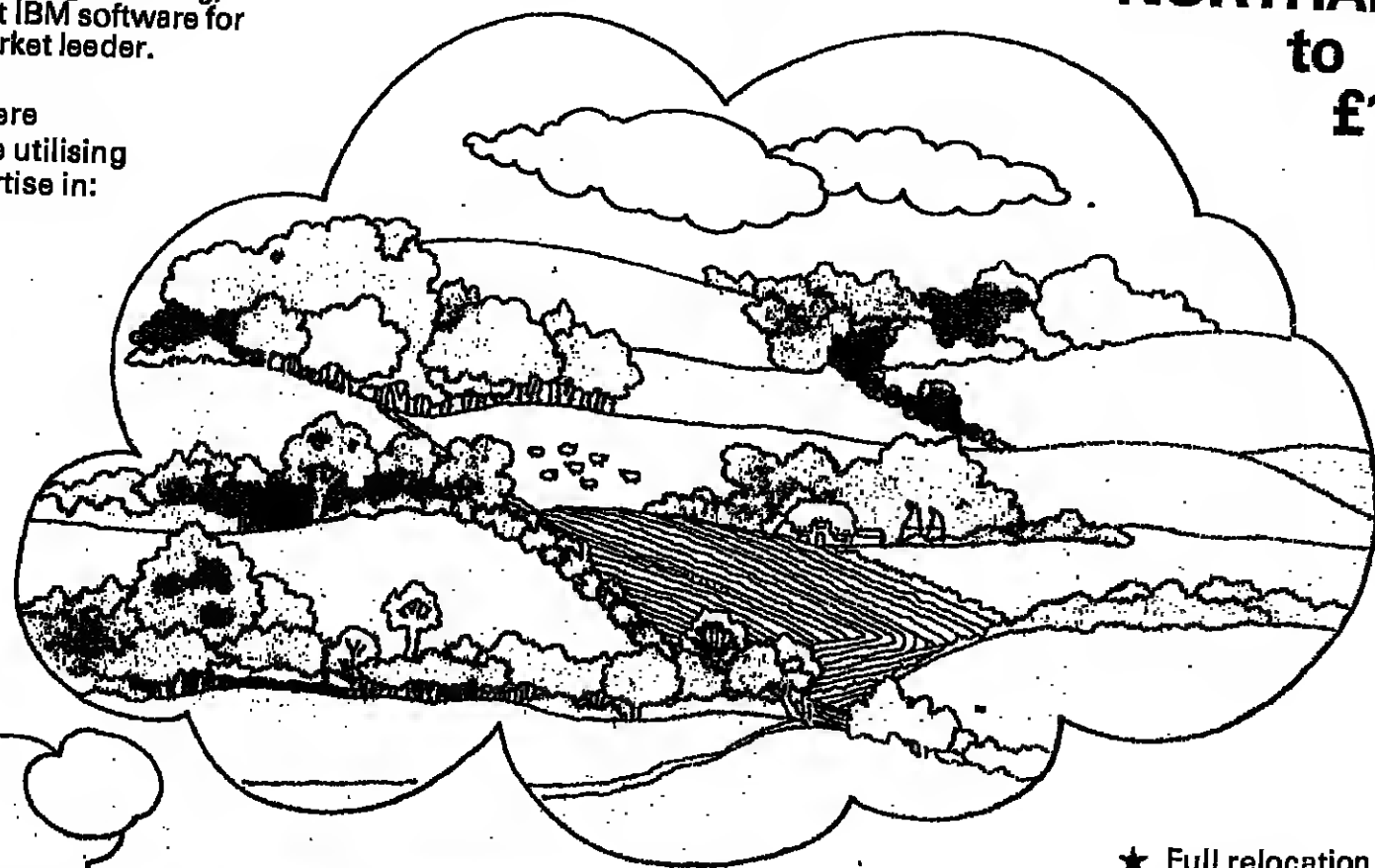
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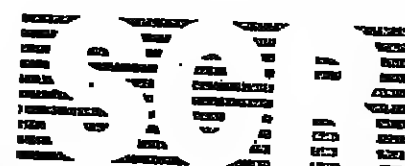
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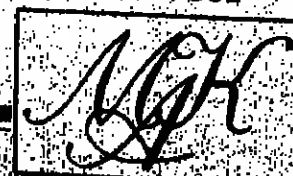
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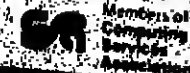
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For further details and an application form to be returned by 2 March 1982, write or phone quoting E3 to Staff Recruitment Department, The British Council, 65 Davies Street, London W1V 2AA. Tel: 01-489 8011 ext 3174 or 3461.



COMPUTER ANALYST/PROGRAMMERS

Dunsfold Aerodrome, near Godalming, is the Flight Test Centre and Final Assembly Plant for the Kingston-Brough Division of British Aerospace. They are now seeking experienced computer professionals to join teams engaged on computer-related aspects of flight testing.

Suitable candidates should have at least two years' relevant experience in one or more of the following areas:

- * PDP11 Computers & RSX11M operating systems
- * Macro II or Assembler level programming
- * FORTRAN programming
- * Computer applications for flight test data analysis.

Education up to Degree/HND level is also required. In addition to a competitive salary, successful applicants (who should have their own transport) can expect a generous benefits package which includes an active Sports & Social Club, subsidised meals and a pension scheme.

Please write with concise career details or telephone for an application form, quoting reference 34/CW, to: The Personnel Manager, British Aerospace Public Limited Company, Aircraft Group, Kingston-Brough Division, Richmond Road, Kingston-upon-Thames, Surrey KT2 5QS. Telephone: 01-546 7741.



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Telephone 01-701 2870 any time for an application form, or write, on a postcard to: The Personnel Officer, London Borough of Southwark, 26 Commercial Wey, London SE16 6DG. Please quote reference CW/8/2865 and job title. Closing date: 18.2.82

OPERATOR

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Candidates should be familiar with an IBM/34 and have 5 years' experience. Our clients demand that your most recent experience must have been within a large or multi-user Honeywell L64/66/DPS environment. Technically, your experience should include at least five years' continuous exposure to CCOS/IDS/IDS software either as a Systems Analyst/Designer or Consultant. Utilising your

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Our client, based in Central London, has an enviable reputation as one of the U.K.'s most prestigious Management Consultancies. An expanding client base in S.E. England has produced vacancies for additional Consultants to join existing project teams. All candidates must be self-confident, presentable and have good personal communication skills. It is anticipated that you will be a graduate aged 28 to 34 with the ability to appreciate problems from a business, technical and political point of view. Particular requirements are for Consultants who have a knowledge of structural design techniques, data base management systems or networking in a commercial data processing environment. Applicants who have experience of leading or managing a project team will, of course, be considered for more senior positions. Ref: L/S/A

BASIC Programmers

Greater London: Pkgs. to £10K

Our client, a renowned Systems and Software Consultancy is currently seeking additional BASIC Programmers to be based at its offices in Greater London. Suitable applicants will be graduates who have a minimum of one year's BASIC programming experience on a leading minicomputer, preferably DEC PDP 11. Successful candidates will join a small project team engaged in the design and development of software to meet user specifications. A knowledge of accounting or banking applications would be a distinct advantage, as there will inevitably be some client contact. Opportunities for career development are excellent and you will be encouraged to learn new programming languages and gain exposure to new hardware. Ref: L/S/I

ATE - Systems Design

Southern Home Counties: Salary to £11K

A highly regarded Company in the design and manufacture of Automatic Test Equipment for Linear LSI, Digital and Laser trimming device systems has a number of vacancies for Systems Architects. Suitable candidates must hold at least one numerate degree and have two or more years' post-graduate work experience. Of particular interest will be those who can conceive and design a system or sub-system for end user applications. Additionally, you will have direct involvement in the resolution of both in-house research and customer test problems. You will frequently be required to actively participate in Seminar presentations and systems demonstrations. Ref: L/S/C

Comms. Consultants

Central London: Salaries to £17K

A world leader in the field of Information Technology and Communications is seeking Consultants and Senior Consultants, with experience of X25 protocol techniques and knowledge of the OSI reference model, to join its Product Development Division. Suitable applicants will be educated to degree level and offer at least five years in programming and systems development, working for a manufacturer or systems and software house. Particular areas of involvement should have included office automation, message/packet switching or Viewdata systems. Candidates able to offer foreign language ability will be especially welcome as the Company has a substantial overseas client base. Ref: L/S/I

VAX Progs./Designers

London & E.E.C.: Salaries to £15K

A leading International Systems Company specialising in the development and sale of communications software is seeking Programmers and Designers for its Central London and overseas facilities. Suitable candidates should hold a numerate degree and have two years' subsequent programming or systems design experience. Fluency in FORTRAN is essential and it is preferable to have had exposure to either a PDP 11/RX-11M or VAX/VMS configuration. Candidates who are fluent in a foreign language especially French or German will be of particular interest to our client. A degree of mobility is necessary since most positions involve both European and transatlantic travel. Ref: L/S/E

Micro Design Engineers

Thames Valley: Salary to £10K

A number of Microprocessor Design and Development Engineers are sought by a leading microcomputer and semiconductor manufacturer. Candidates should have a leading MDS such as ISIS and, also, experience in the design and production of interface hardware and software. A degree of customer contact is a feature of most of these positions and, therefore, an outgoing personality and good communications skills are required. Ref: L/S/F

Honeywell Consultants

Inner London: Salary to £13.5K

A renowned supplier of Total Systems and Software Packages wishes to appoint several Honeywell Consultants. Our clients demand that your most recent experience must have been within a large or multi-user Honeywell L64/66/DPS environment. Technically, your experience should include at least five years' continuous exposure to CCOS/IDS/IDS software either as a Systems Analyst/Designer or Consultant. Utilising your highly-valued skills you will be engaged in the writing of functional specifications, systems design, implementation and live running. Candidates must therefore thrive in an environment where their technical abilities and managerial skills are in considerable demand. Since these positions entail close liaison with both prospective users and senior management, a well-informed approach and mature personality is essential. Ref: L/S/O

Navigation Systems

West Home Counties: Salaries to £13K

A highly regarded supplier of precision electronic instruments is seeking a number of Software Development Engineers and Systems Designers for its Thames Valley Research and Development facility. The Company specialises in the development and supply of software and systems to companies in both the private and public sectors. Current requirements exist for those who hold at least one numerate degree and have a minimum of one year's industrial experience. Practical programming skills must include total fluency in one or more of: PASCAL, FORTRAN or MACRO-11. Of particular interest are candidates who have an in-depth knowledge of the development of compiler software where high reliability is a critical operating factor. Ref: L/S/H

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We encourage applications from successful sales executives or managers from the industry who have the ability to negotiate at the highest levels and a shrewd understanding of business practice and general commerce. In short, we seek a successful businessman who is credible, professional and industrious, and already high earnings orientated. The successful candidate will need to live within commuting distance of the Berkshire head office and it is unlikely that the qualities we seek will have matured sufficiently in a person under the age of 30.

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A Systems Analyst is required to support the Project Leader of a COPICS system which is about to be implemented. Whilst COPICS experience is not essential, you should have at least three years' experience in an engineering or manufacturing environment and be capable of taking a system from specification to implementation.

You should be flexible in your approach to your work as the Company does not believe in rigid terms of reference but rewards initiative and enterprise. We expect you to be good at, and enjoy, user contact from shop floor to board level.

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For further information, please contact MARK IRENS, Advising Director, quoting reference CW04022.

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- ☐ sound experience in two or more of PL/1, Basic, Cobol, and Assembler;
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Team leader/project control experience would be applicable to some of these vacancies.

The Division's work includes total turnkey systems, software implementation, and applications product development. It operates across a very wide range of applications, and for clients at every level of computing experience. You can, therefore, expect an unusually varied and challenging career future with us.

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The Computing Division of the Rutherford Appleton Laboratory runs Unix V7 on a PDP 11/70, a PDP 11/84 and a LSI 11/23 which are part of a local area network based on a 10 MHz Cambridge Ring. Current development work includes Cambridge Ring protocol implementations, servers, a troff backend for a colour microfilm recorder and a X25 wide area networking connection.

Another major development is a virtual memory implementation of Unix on the ICL PERQ single user system involving high resolution graphics and local area connections. A Unix expert is required to develop Unix for this high quality, distributed systems environment.

Posts are based at the Chilton site and will be in one of the following grades:
* Scientific Officer £5,176 - £6,904
* Higher Scientific Officer £6,530 - £8,589
Some assistance with removal expenses may be allowed in appropriate cases. Appointment as a Higher Scientific Officer requires a good honours degree and several years experience in this field.

The Laboratory is a friendly community with its own restaurant and sports facilities nearby. We offer excellent working conditions and benefits include a local transport service, generous holidays, sick leave allowance and a non-contributory superannuation scheme.

For an application form please write to: Recruitment Office, Personnel Group, Science and Engineering Research Council, Rutherford Appleton Laboratory, Chilton, Didcot, Oxon. OX11 0QX, quoting ref VN011 or telephone Abingdon (0235) 21800 Ext. 510. Closing date for applications: 1st March 1982.

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- Experience of financial/commercial systems.

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Applications 12 copies, together with a recent photograph and two references, should be forwarded to the Vice-Principal (Administration) and Registrar, University College, PO Box 78, Cardiff CF1 1XL. From whom further particulars and application forms are available. Closing date 16 February 1982. Reference 2258.

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Computer Weekly

February 18th, 1982

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The February 18th issue of Computer Weekly - Britain's highest requested computer journal - will contain a special feature outlining career opportunities in the North.

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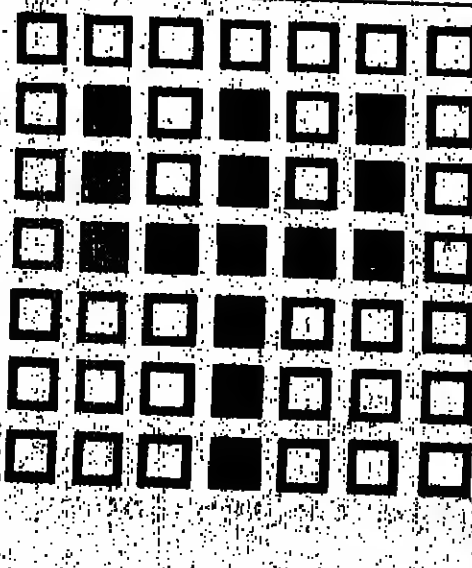
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The Trident Permanent Recruitment Division provides a confidential consultancy service to all levels of Data Processing staff ranging from Operator to Executive Manager.
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We would like to hear from professional men and women who wish to progress their careers in a mainframe, mini or micro computer environment.
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You should have 3-5 years experience supporting a complex Univac site using extensive data communications equipment, and be able to organise and maintain a similar environment with the objective of achieving a high degree of automatic production system running. Other duties will include setting up complex hardware and software test systems using automated test tools such as CS1100.

OPERATORS
Three positions requiring individuals with 2-4 years operating experience on Univac 1100 series computers, preferably with exposure to data communications. We are looking for people with initiative and ability to work unsupervised on technical activities and accept responsibility as a member of a team dedicated to providing a high level of service from the facility to the software development groups. Conditions of service are excellent and are based on a normal working day from 9.00 a.m. - 5.15 p.m.

Successful candidates for all these positions will be given the opportunity to transfer into communications software development groups after a suitable period with the chance to work on exciting projects in areas like public data networks, local area networks and airline systems.

Some degree of short-term travel will be involved, particularly to the U.S.A. The rewards package is excellent including pension scheme and other large company benefits. All the positions are based in a modern, attractive building in Central London with easy access to mainline and underground stations.

If you are interested in these positions, please apply with curriculum vitae or telephone for further information and an application form to: Mrs. Valerie Morton, Personnel Officer, Sperry Univac, Sperry Univac Centre, Stonebridge Park, London NW10 6LS. Tel: 01-866 0511 Ext 3869.

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Programmers and Analysts £8,000-£11,000

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Programmers should offer at least two years' COBOL programming experience gained in either a mini or mainframe environment and be keen to progress their career towards analysis.

Systems Analysts will be required to specify project requirements, schedule development, test and implement the new systems in a phased approach.

Candidates for these positions should telephone, or write, quoting reference WS1/0810. All applications will be dealt with in confidence and we will be pleased to discuss the opportunities offered by our client.

Analysts and Programmers

£8,000-£12,000

Near Waterloo

Our client, a major UK organisation, is seeking career-minded and experienced systems and programming personnel to enhance their project teams currently engaged on an extensive systems development programme.

Applications are invited from professionals with at least three years' data processing experience gained in the development of commercial systems preferably working on IBM or ICL equipment.

This is an excellent opportunity to work on major development of on-line/real-time and database systems. A competitive starting salary is offered, together with generous other benefits. There is full scope for career advancement and further training is positively encouraged.

Ref: SE1/0810

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Ref: C1/0810

Systems Programmers, Systems Designers
& Project Leaders

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HERE'S HOW YOU CAN EXPLOIT IT

Our clients are based in Central Southern England—but they sell their services to the world. Their most recent achievements have definitively set the pace in advanced distributed systems development. To maintain and extend still further their lead in this competitive market, they require the best of today's innovative, talented young minds. Minds capable of being fully stretched in an advanced technology environment. Could this be the opportunity for you to explore what is now being widely hailed as the Information Technology Revolution?

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Remuneration reflects the high calibre and professionalism of the men and women we wish to attract and salaries will be commensurate with your capabilities and experience, ranging between £8K and £16K. This will be backed by a generous benefits package including at least 24 days holiday, contributory pension scheme, and relocation assistance where appropriate.

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PLEASE WRITE QUOTING REFERENCE W294-68 WITH YOUR OWN CV,
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Client interviews will be arranged within
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A Research Officer is required to join a team funded by an EEC grant, investigating the application of database techniques in the field of health information systems. Applicants should have an MSc in computing. Applicants for a post as Research Officer level should have previous professional computing or research experience in order to pursue the project with a minimum of supervision. The Polytechnic is a direct grant institution with an independent Board of Governors. It opened in 1971 and has a purpose-built accommodation, including 830 residential places on the 114-acre campus, overlooking the sea at a pleasant and quiet residential area. There is a scheme of assistance with removal. Further particulars and application forms which must be returned by 22 February 1982 may be obtained by telephoning Whiteabbey (0231) 65131 Ext 2243 or by writing to:

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If you are interested please write to Roger Carver, MRL, Lloyds Bank Chambers, Crown Glass Place, Nallase, Avon BS18 2EW

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An International Telecommunications Company is seeking Software Programmers to develop new Software for PUBLIC DATA SWITCHES SYSTEMS. Candidates should be in their mid to late 20s, have a degree, plus a minimum of 2/3 years' Assembler experience in a telecommunications environment. Alternatively candidates with operating systems experience would be equally valid. Successful candidates may look forward to enhancing their career progression, gaining valuable experience in an international environment.

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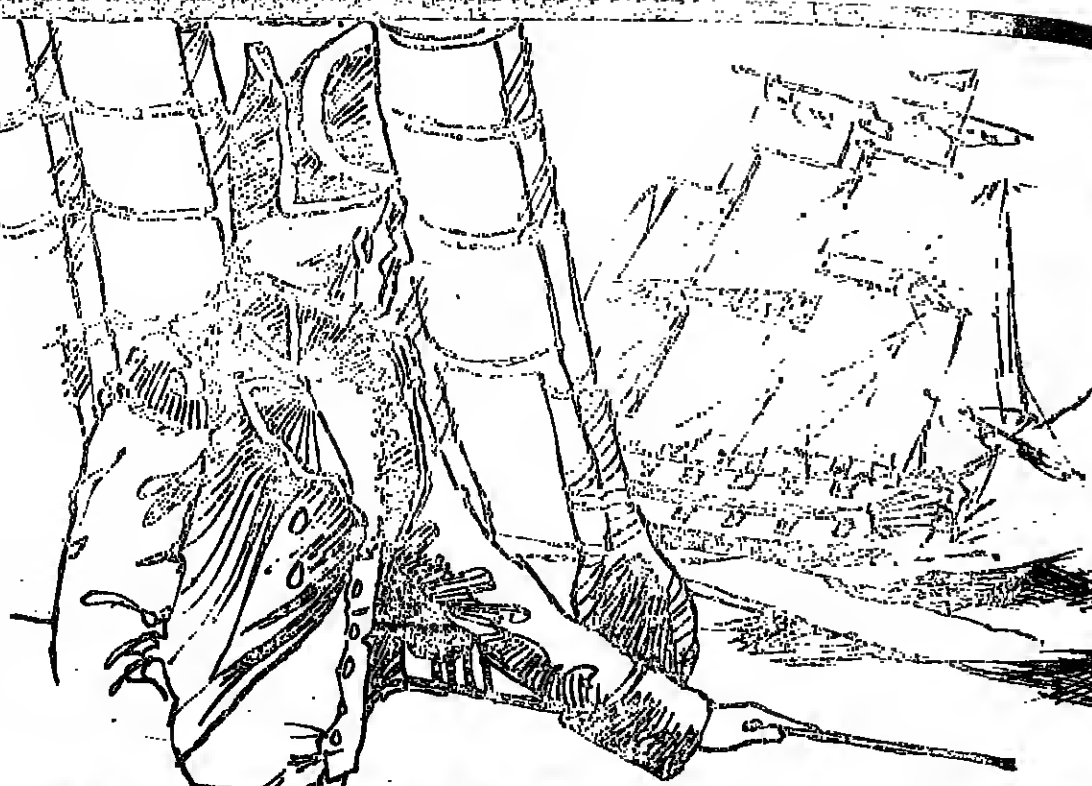
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In-house training, where appropriate, will provide you with valuable education in IDMS Database, CICS and TELEPROCESSING techniques.

The Company is a firmly established world leader in advanced transportation technology with an impressive record of growth to date. To sustain an efficient worldwide business and its leading position, our client has undertaken a massive and continuing investment in hardware and systems.

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COBOL IMS/DB VM/CMS COBOL RPGII CICS PRIME FORTRAN or COBOL ADABAS	Programmer Programmer/Analysts	New York Philadelphia
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For more information
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IBM - RPG AND COBOL SOFTWARE NORTHEAST - NORTHWEST EAST MIDLANDS, YORKSHIRE

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Applicants should have at least four years' experience in RPG along with a relevant background knowledge of IBM minicomputers. Experience of System/34 and/or System/38 is essential. A working knowledge of COBOL or BASIC would be advantageous.

If you feel that your potential can be realised through the challenge of working within an innovative and stimulating environment with secure prospects and career development, please ring Ruth Berger on 081-707 4399.

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Candidates who are nationals of one of the NATO countries are invited to send full details of training, experience and personal data to the Personnel Officer, SHAPE Technical Centre, PO Box 174, 2501 CD The Hague, Netherlands, quoting reference MC/1/82, not later than three weeks after the appearance of this advertisement. (8248)

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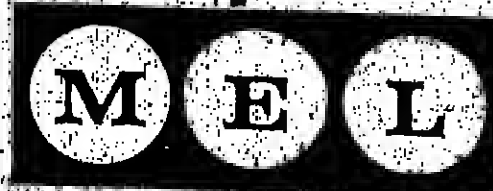
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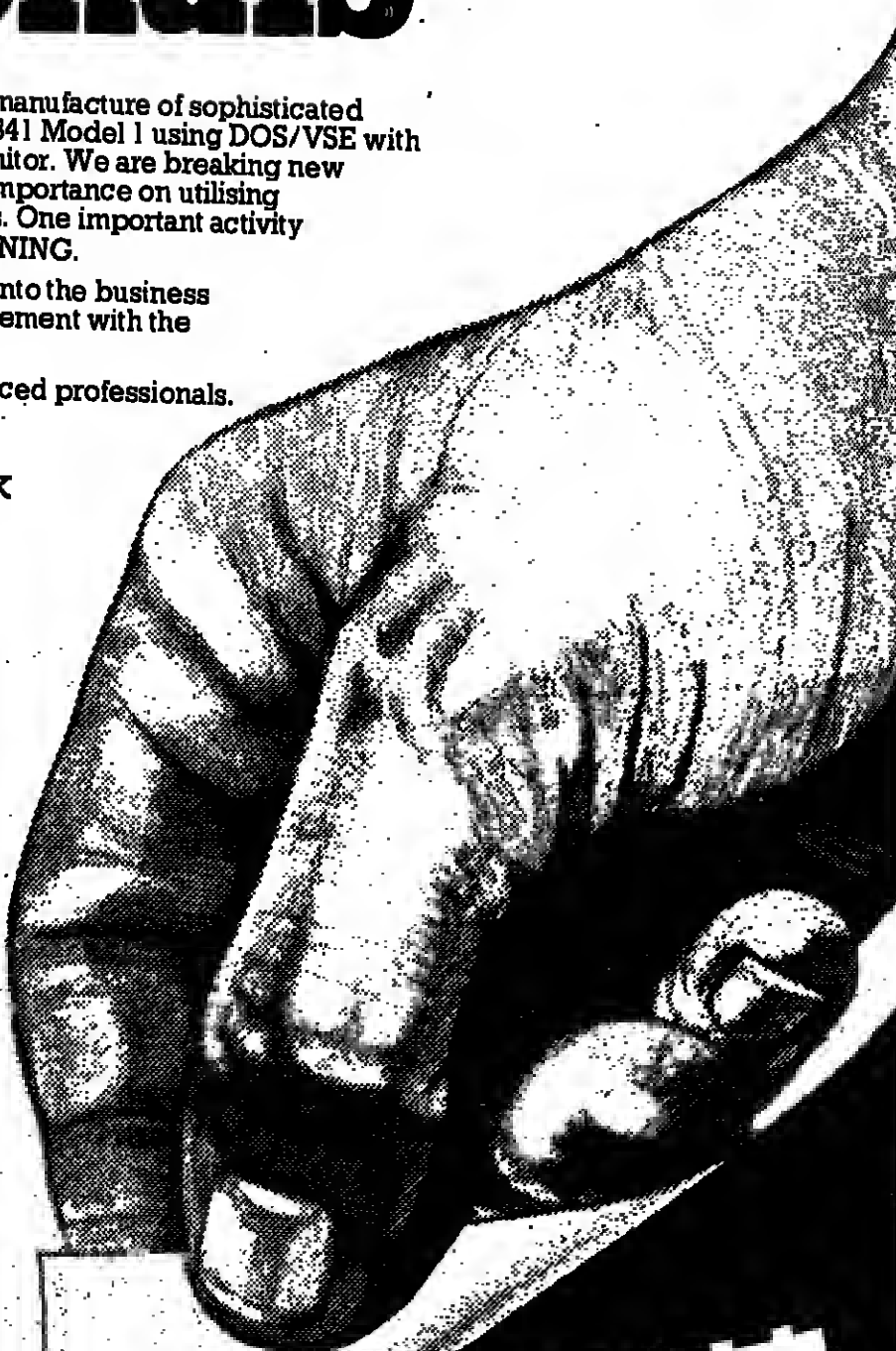
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0293 28787



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The Computing Science Branch is responsible for developing and researching into the application of computers to information systems, econometric modelling, operational research and financial modelling. DEC VAX-11/80, Perkin Elmer 3200 and PDP 11/85 machines are maintained and operated plus several microprocessors. Programming languages in use are COBOL, ADA, BCPL, ALGOL, FORTRAN and BASIC. The successful candidate will be expected to undertake teaching and project supervision in various aspects of computing science, including data base, operating systems and programming languages, at

undergraduate, graduate and specialist levels; prepare and supervise practical work in support of teaching, and systems software in support of research, on the College's main frame and mini-computers.

Candidates must have a first or second class honours degree or equivalent in computing science or a related discipline. Experience at the latest level, particularly with any of the machines or programming languages used by the College, will be advantageous.

Appointment will be as Senior Lecturer (£3205 - £10320) or Lecturer (£5175 - £8950) according to qualifications and experience. Starting salary may be above the minimum at each level. Promotion prospects to £13000 and above. Accommodation may be available for single staff.

For further details and an application form (to be returned by 28 February, 1982) write to Civil Service Commission, Alencon Link, Basingstoke, Hants RG21 1JB, or telephone Basingstoke (0256) 68551 (answering service operates outside office hours). Please quote ref: S/D/908.

182761

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LECTURER I IN COMPUTING

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Computing studies is an expanding area within the College and the successful candidate would be involved in the planning of future developments.

Application forms with full particulars are available from the Principal of the College, Port Road, Letterkenny, Co. Donegal, Ireland, (Tel. 074-21111) with whom completed forms must be lodged not later than Friday, 19th February, 1982.

Sean O'Loughlin
Chief Executive Officer

Vocational Education Committee Office,
2 Port Road,
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183311

Lecturer

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REGIONAL COMPUTER UNIT

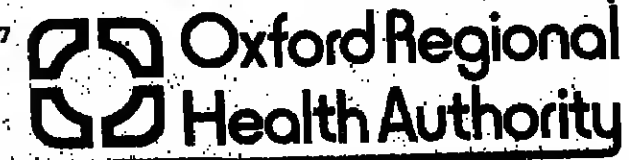
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The Recruitment Officer, Oxford Regional Health Authority, Old Road, Headington, Oxford OX3 7LF.

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Computer Weekly

100,324 ABC Jan.-June 1981

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SALES BIT

The dangers of doing business with a friend

BACK in 1979, I was introduced to some of the latest developments in telephone equipment that had been made possible by rapid advances in the micro-miniaturisation of electronic equipment.

This included cordless telephones, answering machines, telephone amplifiers and memory telephones. I was impressed and excited by what I saw and subsequently decided to set up a small company to market such products.

I have to say in retrospect that the venture was more euphoric than profitable and, when my main supplier went into liquidation, I decided to call it a day. There were alternative sources of supply and the business could have continued profitably, but there was much "writing on the wall" to suggest that I could be doing better things with my time and money.

I found that brief experience extremely interesting and several situations occurred from which I was able to learn valuable lessons, or at least be reminded of some selling realities.

There is a time-honoured axiom that suggests one should never do business with friends. I have to admit that, on more than one occasion, I have attempted to prove that integrity and common sense can protect the individual against the pitfalls implied in such gems of distilled wisdom, but have experienced more failures than successes.

Our marketing strategy was to limit the product range to one item within each category of telephone equipment. We were involved in a considerable amount of product evaluation and were eventually convinced that the chosen products had the best price/performance available at that time.

We sold quite a lot of machines, but the only real comfort to come from the entire experience is that we only had one client complaint that his equipment was faulty. Indeed, our supplier often said that he had very few problems with reliability and such problems as he did have were almost entirely related to equipment with moving parts rather than solid state devices.

By this, he meant answering machines and explained that on the rare occasions problems did occur, they tended to be the same problem with the same batch of equipment.

I only once sold a piece of telephone equipment to a friend and, as students of Murphy's Law will already have guessed, he was the person who purchased the faulty equipment. Bad news!

As a friend, he expected special treatment — after all that was his primary motivation in buying from me. In fact, that is what he got, but it wasn't special enough as far as he was concerned, and things became a little heated.

It was at this time I began to appreciate the wisdom of that old axiom: it is bad to lose a customer but a catastrophe to lose a friend.

Fortunately, we sorted the matter out and, after the dust had settled, I tried to discover why the matter had

got a little out of hand and why his reactions had been so extreme. It turned out that there were three main reasons: Expectation of special treatment, a transient personal problem which had put him under stress, and lack of faith in the product.

The first I have mentioned, the second was happily resolved, but the third came as a complete shock.

I eventually learned that on the day he had brought his machine to my supplier's workshop he had been involved in a conversation with the receptionist while waiting for the telephone engineer. He told her about his problem and she responded with what she apparently believed to be a conciliatory and sympathetic remark: "We often have that kind of problem."

The fact that the receptionist had only been with the company a couple of weeks and wouldn't know an answering machine if she fell over one was of little consequence. My friend, already burdened with the frustration of the problem machine, could not be expected to evaluate the technical competence of the girl or the validity of her statement.

He simply saw it as a confirmation of a suspicion he had in the back of his mind. All the equipment was junk and he had been ripped off. In reality, the girl had been trying to help and she thought that her sympathetic statement would give the client confidence in the company's ability to understand and solve his problem, having experienced it before.

Certainly, the supplier had experienced problems of a similar type before but, relative to his total volume of equipment, they were negligible. The comment the girl had made was truthful but totally out of context.

An apparently trivial comment by a member of staff can easily lead to difficult or even disastrous circumstances. It is most important that secretaries, technicians, telephonists and so on, are made aware of the enormous importance of their role and the profound implications of ill-considered comments.

Alan Williams

PUZZLE ANSWER

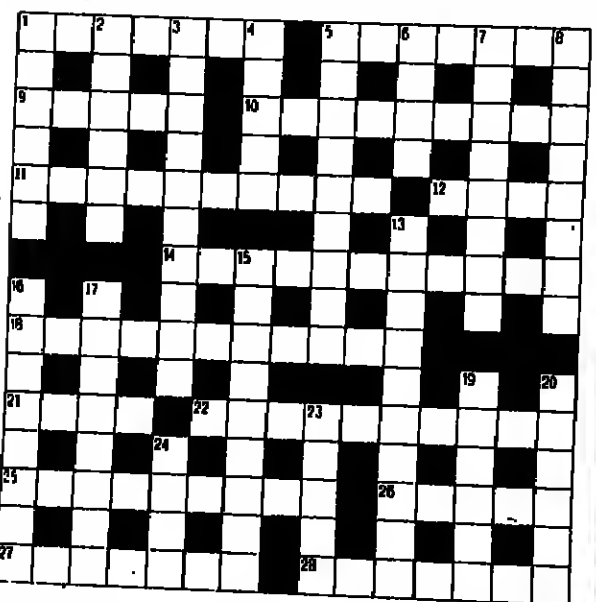
ORDER-5 magic squares generally have their central number exactly one-fifth of the constant. This enables the 16 to be positioned with some confidence, and the remaining analysis is thus simplified. The sequence utilised is in fact 4 to 28, and the complete square is:

19	21	10	5	25
9	18	12	26	15
28	8	16	24	4
17	6	20	14	23
7	27	22	11	13

Prize Crossword No 25

Compiled by Alec Rhins

A prize of £10 will be awarded for the first correct entry opened. The second and third solutions opened will receive £5 each. Entries to Crossword Competition, Computer Weekly, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS, by first post Friday, February 12. Please use a ballpoint pen to complete the crossword, and include a telephone number at which you can be reached during the daytime.



Name..... (Miss, Mrs, Ms, Mr)

Address.....

Telephone.....

I accept the rules and conditions of the Computer Weekly Crossword Competition.

Signed..... Date.....

ACROSS

1. Withholding of facts is at an end in the vessel (5,2)
5. With no backsliding, those protected by guardians will get ahead (7)
9. Money obtained by eff-strocity (5)
10. Don't stress importance of editor, taken in by foolish friend (4,5)
11. Eastern member receives censure to your communication by signals (10)
12. Formerly somebody about a hundred (4)
14. Recalling English MP in the arena (11)
18. Awaiting a reprimand? It's under discussion (2,3,6)
21. The girl had to cast off (4)
22. It can keep Scots on their toes and send a crowd wild (5,5)
25. Allowance of jet fighters for removal to another country? (9)
26. A long time going round the North to find a girl (5)
27. Provide new home for backward male - get excited about it (7)
28. Signs on, only half finishes, and heels over (7)

DOWN

1. Copper coins once used as measures (6)
2. Sailor, though in foul environment, having prospect of success (6)
3. Girl given information about a highway's fragrant spot (4,6)
4. Dough you can get in a street in Pennsylvania (5)
- 6,5. Terrible fate of Whip, MP's put into oblivion (4,3,3,5)
7. With rubbish about the study I'll get a collection of squirrels, mice, etc. (8)
8. Border of material, a decigram, fitted into ragged sleeve (8)
13. Ceremoniously-dressed noble thrashed Lear shamefully (6,4)
15. Intend having leader of House caught by trick in the interval (9)
16. Very thin material says more when loose (8)
17. Number on the nominal roll showing vigour (8)
- 19, 20. Quite sane, sees nine songs going mad (2,4,6)
23. A dusky queen, one keen to follow a king (5)
24. Bao that upsets posh club (4)

RULES AND CONDITIONS

1. Each competitor may submit no more than one entry.
2. The competition is open to all readers of Computer Weekly with the exception of the staff of IPC Business Press Ltd, any printers employed by them or the near relatives of any such staff.
3. The solution of each puzzle will normally be published in the issue three weeks after the puzzle has been published.
4. Winners will receive their prizes during the month following the competition.
5. The decision of the editor on the interpretation of the rules and conditions and on all matters shall be final. No correspondence will be entered into.

CONTRACTS

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The Computer Services Manager,
Barclays Unicorn Group Ltd.,
Unicorn House, 282 Romford Road,
London E7 9JB.



Royal County of BERKSHIRE

COMPUTER LIAISON OFFICER

£6,100 with possible progression to £9995

The department is extending the use of Computer systems in a range of management information and client data applications. The work will have a strong development element and experience in Computer systems and/or Social Services administration is desirable.

Further information and application form from Departmental Personnel Officer, Social Services Department, Shire Hall, Windfield Park, Reading RG2 0HN. Tel: Reading 85444 ext. 4842. Closing date 19.2.82.

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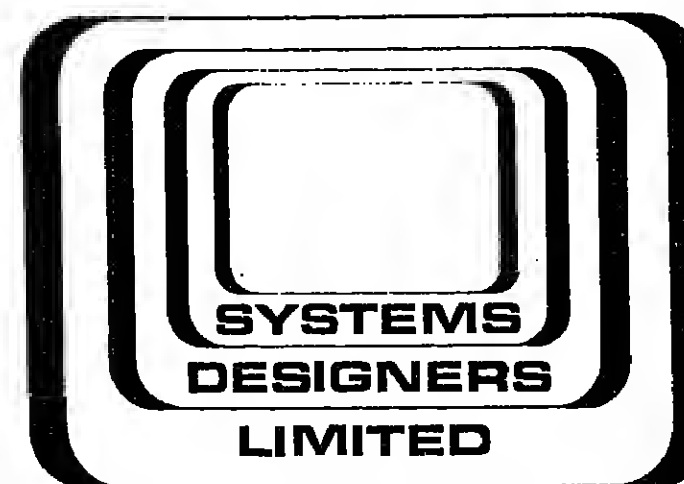
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